BROOKLYN BOTANIC GARDEN

# PLANTS & GARDENS

BROOKLYN BOTANIC GARDEN RECORD

# CONTAINER GARDENING

- Best Locations For Best Results
- Containers, Hanging Baskets and Window Boxes
- Roof and Balcony Gardens
- Trees, Shrubs, Flowers, Vines and Vegetables

PLANTS & GARDENS

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Vol. 34 Spring (May) 1978 No. 1

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*No shortage of ideas for . . .*

# PLACES FOR CONTAINER PLANTS

Alice Upham Smith

There is a place in any garden for plants in containers. In the homeowner's effort to achieve low maintenance, gardens have become predominantly green, and plants in containers are an easy way to put seasonal splashes of bright color and glamour where you can enjoy them. They also add the drama of form as an accent against a bare wall and the softness of foliage to paved areas.

Containers can be large and permanently placed, or small and movable, according to the mood of the gardener and the weather. Heavy permanent containers such as terra-cotta pots in Italian style, elegant urns, utilitarian flue- or sewer-tiles, weathered wooden tubs or colorful modern ceramic pots are good looking in themselves. They contribute to the structural design of the garden and heighten the effect of the plants.

### Around the House Exterior

Put containers of annuals among ground covers on each side of the entrance walk. A pair of containers filled with flowers or evergreens can add impact to a plain doorway, making it more stylish and welcoming. I know of one house that was quickly sold because the owner placed pots of geraniums in graded shades of light to deep pink on the three front steps.

A pair of containers is not always necessary. Many times there is a shaded corner under the eaves where a plant will not thrive. Here one container of shade-loving plants will provide helpful decoration. By the side of a woodshed door in the country, a single tub of geraniums makes a warm glow of color all summer.

Steps are a natural place to use plants in containers. Mark the tops of the steps with low pots of flowers or, if the steps are wide, put pots at the corners of each step to make a most inviting pathway.

Quite often patios, terraces and decks are built with no place for planting between the paving or floor and the building wall. Permanent containers with shrubs or groups of smaller pots with house plants in summer will solve the problem of getting some cooling green decoration against the walls of the house. Use clipped evergreens, espaliered dwarf fruit trees, vines on trellises or annuals. To cut the glare and heat of the sun on large southerly windows facing a patio, put several small deciduous trees, such as Russian-olive (*Elaeagnus angustifolia*), in containers out in front of the windows.

Where there is a large area of paving and no trees container plants will help to divide up the space and break the monotony. They are especially useful and decorative in paved areas around public buildings and apartment complexes, taking away the grim aspect of so much steel and concrete.

A small patio or dooryard garden with no apparent space for plants can benefit from plants in hanging baskets, hung from the eaves, from an overhead trellis or from brackets on the walls. A bookcase hung on a wall can hold small plants in pretty containers.

### Pools, Gardens and Other Areas

A border of plants in pots around a pool doubles the enjoyment as the reflections of the flowers send back the colors. For a square or rectangular pool try a container at each corner. A fountain backed by three to five tree roses in large pots is, to me, the ultimate in glamour. A woodland pool or spring shows up dramatically if it is given the added importance of a container of flowers set on a rock beside the water.

Flower gardens also benefit from having a focal point, and a container with annuals makes a good one. Put urns of annuals on top of gate posts leading to the garden. Use them at each end of a flower border in the lawn. A formal flower garden can have a large container with a

George Taloumis

A pool in a city garden is surrounded by boxwood hedges and accented at water's-edge by large containers of late summer chrysanthemums. In other seasons, other plants can be rotated in for best effect.

specimen plant as a center of interest. The center of an herb garden planted in a knot pattern is a perfect place for a strawberry jar. In fact, you can have a miniature herb garden and keep the rampant growth of herbs in bounds by growing them in a series of wide containers such as tubs or flue tiles. Grow such invasive plants as bamboo also in containers and have the pleasure of the feathery foliage without worrying about the roots spreading out of control.

Porches and decks need plants in containers to look finished. Hanging baskets, plant stands with places for many pots and baskets or large containers of plants on the floor all add to the livability of a porch in the summer. On a deck a wide spot can be made for a large container at a corner where the benches or rails meet.

George Taloumis

The intense sun of the sub-tropics makes veranda gardening, using reflected and direct sun, easy. Among the display are (l to r) *Beaucarnea, Dracaena, Monstera deliciosa, Agave, Yucca,* variegated succulent and banana.

Put a Japanese maple in it for an exotic note. Smaller pots in free-standing window boxes can line the rails with trailing plants. The open side of a carport is another good area for containers. Set the pots along a low wall, or hang them between the supports.

Balconies and roof gardens could not get along without plants in containers. It is the only way to garden on a rooftop. Since space is limited, choose containers carefully for their growing space and style. In a small area one large container with several smaller ones would be better than several all the same size. Because of the wind on balconies and rooftops, containers need to be heavy or securely fastened down.

Mobile homes also benefit from container gardens. Since the property is usually rented, container plants dress up the property without putting money into plantings the next person may not want. Use hanging baskets and containers with shrubs around the doorway or around a paved patio. Benches alternating with plants in large pots would make a nice edge for a patio as well as supplying extra seating. The hitch is a good spot for pots of geraniums.

Plants in containers are an asset to any aspect of the garden scene. They add a needed personal touch.

*Ivan Flye*

If your architecture is rustic or Early American, consider using farm utensils, like this oak tub with steel straps, to enhance a dooryard or sunny corner.

# HOW DOTH YOUR WOODY PLANTS GROW?

## Attention to the soil pays dividends

Linda Yang

Considerable time and money is invested in patio, terrace, rooftop and penthouse gardens. It means buying containers, selecting plants, planning and planting. The first year everything looks great but, too often, several seasons later, few of the original woody plants are fruiting or flowering well, if they are still alive. Many a disappointed gardener is bewildered as he searches for an insect pest or disease to blame. It may never occur to him that his container trees, shrubs or vines may be faltering because of other reasons.

One of the primary causes of container-plant decline might be called malnutrition. The plant has insufficient "food," or, more accurately, there is a lack of available nutrients in the soil. The original potting mixture may have been rich and fertile, but several seasons of use, combined with the continual leaching of nutrients from the tub, usually means that there is nothing left of value for the plant. In addition, time and the elements work together to compact the soil. As this happens, the oxygen around the roots is reduced and water can no longer penetrate the soil properly.

### Rejuvenation without Repotting

If lack of nutrients and soil compaction are affecting your container garden, it's time to remedy the situation. Although a major revitalization should be undertaken only in early spring, a start can also be

*Plant Specialists/NYC*

A brick retaining wall in a roof garden lets juniper, dogwood, tulips and daffodils cheer up the skyline.

Linda Yang

Another roof garden, including a small statue, combines the textures of Japanese black pine, procumbent cotoneaster, English ivy and azalea. All are evergreen or semi-evergreen.

made in late autumn, after the deciduous plants have lost most of their leaves.

You can begin by digging in all around the plant, turning the soil and adding some well-rotted cow manure or compost. This will condition the soil and provide a hospitable environment for the beneficial microorganisms that live there. Don't hesitate to remove several trowelsful of old soil from the tub if necessary to make room for fresh matter.

To increase the soil's fertility, work in some organic or mineral sources of the three main nutrients needed for good plant growth. First, restore *nitrogen*. This is the element required for lush leaves and the nutrient most likely to be missing from old soil. Nitrogen is found in large degree in blood meal, soybean meal, cottonseed meal or fish emulsion. Then work in *phosphorus*, the element essential for good flowering and fruit set. Phosphorus may be restored by working in quantities of bone meal, rock phosphate, oyster meal or, if you are not an "organic" gardener, superphosphate. Finally, replace the lost *potash*. This is the element which helps maintain sturdy disease-resistant plants and aids in good root formation. Several sources of potash are wood-ashes, green-sand and rock potash.

These organic and mineral sources of the three major nutrients are available at garden centers and nurseries. Alternating them with various commercial (chemical) fertilizers periodically provides plants with a well-rounded diet. Recommendations for fertilizer dosages may be found on the package labels, but these may have to be altered for use in contain-

ers of different depths. If your container is particularly shallow or deep, you would use respectively less or more fertilizer.

As you dig in, adding the various nutrients and conditioners, compacted soil will also be improved. But to maintain a friable, well-aerated medium for a longer time, work in some perlite or vermiculite. These are lightweight, inert rock derivatives which will resist compacting. I prefer them to builder's sand, which because of its weight is impractical for tubs that are to be moved.

### Soil Tests Help

While observation of your plants will give a fair idea of the nutrients which may be missing, a soil-testing kit will pinpoint insufficiencies sooner. There are kits for determining the nutrient percentage as well as the pH value of the soil. If the pH is too high (alkaline) or too low (acid) for a particular plant, the plant will be unable to make use of the fertilizers that are added.

For example, for best flowering, clematis vines, geraniums and many begonias need a soil which is neutral to slightly alkaline. If the pH is too low for them, it can be raised by adding ground limestone. On the other hand, rhododendron, azalea, dogwood and many evergreens require a soil which is distinctly acid. To provide this, work in peat moss or small amounts of aluminum sulphate.

Rimming a terrace, half-round redwood containers being planted with European birches, dwarf yews and other evergreens that will be underplanted with ivy and spring bulbs.

*Plant Specialists/NYC*

**Root Pruning and Supplemental Watering**

With all the digging and soil churning that I have suggested, you may worry about the roots which will be cut, but successful container gardening with woody plants involves *purposely* cutting away some of the roots periodically. This is the only way to keep a large plant sufficiently dwarfed so that it will thrive in the limited space of a container. To do the root pruning, however, it is unnecessary to remove the plant from its tub. Instead, simply dig in deeply all around, and take out several large handfuls of old roots. Then, when that's done, cut away some of the upper portions of the plant. In this way you will be grooming the plant while simultaneously compensating for the loss of the roots. As fresh top-growth takes place, new, more efficient feeder roots will have room to develop in the soil.

A final major cause of loss of woody plants in containers is insufficient moisture. This is especially hard to detect during autumn and winter in cold climates for at this time there are no wilting leaves or drooping flowers around to warn you. Although their systems are slowed during the dormant period, some water is still needed by the plants. Check the soil from time to time for dryness. Also, keep an eye on the actual amount of rain (or snow) all year long to determine when nature needs your help.

*Plant Specialists/NYC*

# Trees in Containers

The mortality rate of trees in above-ground containers is high, especially in the northern United States. Sometimes they do not receive the watering they need during the growing season. More often, winter is the cause of death. The limited amount of soil in a container is subject to rapid freezes and thaws, so the larger the container choice, the better the chance for survival. Also, in the case of many normally hardy trees, the roots frequently cannot tolerate the same amount of cold as the top portions. Magnolias are a notable example.

Trees in containers are living in conditions like those found in the Northern Plains. They must put up with strong winds, intense cold and sudden heat. The safest procedure is to grow trees that are hardy to at least a zone or two north of where you live. There is some evidence, as nurseryman William Flemer III points out in "Trees for Container Use in Landscaping" (*The Garden—Journal of the Royal Horticultural Society,* Vol. 102, Part 9), that pioneer species, *i.e.*, those trees which are the first to seed into a field when it is abandoned, are the fittest for survival in containers.

Some humus in the mix is essential, but Flemer also stresses the importance of perlite in a soil mix for container trees because it does not break down and compact as quickly as humus. One successful mix that he cites consists (by volume) of 45% sandy loam, 10% coarse spaghnum peat, 25% horticultural-grade perlite and 20% calcined clay particles; in addition, enough ground dolomitic limestone to raise soil pH to 6.0, superphosphate (2 lbs. per cubic yard of mix) and a small amount of fritted trace elements.

*For year-round beauty . . .*

# GROWING EVERGREENS IN CONTAINERS

Corinne W. Willard

Elegance, serenity and beauty come to our gardens when we use good evergreens. Fortunately, there are both broad-leaved and needle evergreens which can be grown well in containers on terraces, decks and balconies. In addition, certain kinds may be grown as house plants during winter months in the North.

### Containers

Committing plants to life in a container means that their needs must be considered when containers are chosen. Since we hope for several to many years of growth, container durability is important. Cedar or redwood tubs or boxes are attractive both when new and after years of aging in the weather. They are most appropriate with less formal homes, although painted wooden containers can be used almost anywhere.

Durable concrete containers in a variety of sizes and shapes are available at most modern garden supply stores. Whether your attraction is to wood, concrete or other types of containers, make sure that the ones chosen have drainage holes and that crock shards are placed in the bottom. Very few plants, evergreens or other kinds, tolerate continually soggy conditions.

Receptacles of brick/mortar or stone/mortar can be constructed for terraces or patios. These will be permanent architectural features which can allow the use of vines, espaliered plants or a garden along the building wall. Remember to allow drainage from these containers; the water may be led away by pipe or gutter.

Sturdy, heavy-gauge plastic containers are manufactured in beautiful colors to blend with outdoor structures or to serve as garden accents. Many plastic sorts come also with attached saucers. These are a wise precaution especially if containers are to be placed on balconies or wooden decks above your apartment house neighbor. Make certain to empty saucers after a rain. Even large plastic containers with the combined weight of moist soil and plants can be tipped to allow excess water to run out of the saucer.

Spanish or Italian pottery containers have long been used in gardens. Some are nicely embellished, others have soft, earthy colors with plain designs. Evergreens grown in plastic, clay or ceramic pots can be brought inside in colder areas, because they are subject to cracking under freezing conditions. These containers can be used as jardinieres with the plant actually growing in a removable pot within the clay, plastic or ceramic receptacle. This way the attractive container can be used outdoors during suitable weather, and the plant stays in the inner container for winter protection.

### How Large a Container?

This is puzzling because the gardener wants an attractive plant/container relationship right away, and yet, for those plants which do better in one location for several years, the container should be larger than what seems in scale. It is important to use containers large enough to accommodate the present size of the rootball and to allow for two-to-three years of growth. For best growth of most evergreens, annual transplanting should be avoided.

Certain devices can offset the visual imbalance of a plant and its container. One is to underplant the specimen tree or shrub in the first years. (See below the list of plants suggested for this purpose.) Another is to arrange containers in groups so the viewer's eye will be drawn away from the plant/container scale.

Plants in small containers are subject to root damage if the soil becomes too hot. Effective root growth stops at 90° F, and small containers of soil can heat up quickly in a sunny spot. If you must use small pots, devise some means of shading

George Taloumis

Mugo pines in matching urns give a visual break to the symmetry of foundation plantings and appear to bring the welcome forward, inviting the guest in.

both them and the soil; in addition, in very hot regions a mulch is essential.

### Soil, Planting

Evergreens in containers require a good soil mixture. Ready-made, bagged potting soil (not a peat-lite mixture) or garden soil can be used, but sharp sand and organic matter (compost, moistened peat moss or ground bark) should be added to either. A good mixture contains equal parts soil, sand and organic matter. The addition of a long-lasting fertilizer (and ground limestone, except for acid-soil plants) may be desirable but it is wise to have the soil mixture tested first. If the mixture is properly prepared, you will not need to add fertilizer the first year or two after planting.

An evergreen is transplanted with soil ball intact, but if the roots are pot-bound from a previous container, use a sharp knife or pruners to partially open them up. This is especially important with encircling roots, which should be straightened or cut. The routine removal of crossing or weak branches at planting time will compensate for the loss of a few roots.

### Shaping, Culture

When an evergreen has been in its new container several weeks, consider its shaping if this was not done at planting time. Some needle evergreens can be pruned in midsummer when the second flush of growth occurs. If you don't prune at that time, wait until growth ends later in the season. Pruning too late in summer can force unseasonable growth which does not mature enough to survive cold weather.

Water consistently during the growing season. (Fortunately, most container-

grown plants are used near the home, where attention to watering is easier and more likely!) In colder areas, water the plant during the autumn months so the root system is well-prepared before freezing of the soil takes place. In warmer climates, remember winter watering during dry spells.

Inspect plants frequently during the growing season. Be ready to use hose water under pressure to force away aphids and to discourage spider mites. Some mites are very troublesome to juniper and spruce. Pine shoot moth, spruce gall aphid and other pesky insects find plants growing in containers even on balconies many floors above ground! Scale insects can be a problem on pine and euonymus. For many of the sucking insects, systemic insecticides can be applied to plant parts by spraying, or by the use of a granular form spread over the soil and watered in. If you can find it, nicotine sulfate is effective against aphids. Leaf miner on holly and box may be controlled with Diazinon or systemic insecticides.

Leaf-spot diseases sometimes attack azalea, rhododendron and mountain-laurel. To control, use Ferbam, Captan or Benomyl (systemic) fungicides according to suggestions from your County Extension Service Agent or from your garden supply store.

Strong winds are troublesome to gardeners in many areas. They carry dirt, sand, salts and debris, all of which contribute to plant damage. It is necessary to place container-grown evergreens on protected sides of homes or to erect windbreaks for protection. Attractive screening can add to the interest of a well-planned garden as well as to protect the plants.

A formal city roof garden created entirely from plants such as yews, chrysanthemums and geraniums in movable redwood tubs. Ivy is underplanted in the center statuary.

George Taloumis

### Winter Protection

Winter protection may require special arrangements. Pine and yew should be growing in good-sized containers so their root systems have fairly large amounts of soil around them. If these plants are healthy and are well-watered in autumn, they will usually come through cold winters. Evergreen privets and hollies, however, may need protection from windburn, especially at the northern limits of their zones. (Winter protection is also recommended for rhododendrons.) If the container is too large to move, the protection may be a combination of screening and spraying with anti-desiccants. Screening is essential in the North if broad-leaved evergreens are exposed to full winter sun after leaf-fall from surrounding trees. Bright sun along with strong winter winds may mean serious moisture loss and subsequent browning of the edges of the leaves or of the entire leaf surface. Use wooden or woven (burlap) screening as tall as the plant, but keep it open at the top for ventilation.

Smaller plants in smaller containers may be treated in the same manner as bonsai enthusiasts treat their treasures. An unheated pit house with a good arrangement for ventilation on warmer, sunny winter days, should provide excellent quarters for evergreens in containers. Watering will be necessary although not as often as during the growing season.

### Form Training

Topiary evergreens in containers are found in plazas and shopping centers across the country. Round, pyramidal and square or rectangular forms are seen, and sometimes interesting forms atop straight bare stems (standards) are used. Yew and evergreen privet, in milder climates, are two evergreens commonly used for topiary. Adventurous home gardeners can use these forms, also, especially for dramatic effect in limited spaces. Proper and repeated pruning is required to develop and maintain these forms, but the results can make your garden special.

One good way to begin container gardening is to use tried-and-true evergreen plant materials which are easily available locally. After that, the gardener should seek other good plants from more distant sources. Here is a list of some worth trying.

## EVERGREENS HARDY IN MOST REGIONS

### Needle Types

Arbor-vitae, especially *Thuja occidentalis* cultivars. Scale-like foliage. Sun. Dwarf or slow-growing kinds preferable.

Juniper (*Juniperus*). Sun. Tolerates dryness. Upright or spreading spp. and cultivars. Some fine forms, including columnar.

Pine (*Pinus*). Sun. Many spp. Upright, slow-growing, dwarf or weeping cultivars. Compact forms of mugo pine often used, also dwarf white pine.

Spruce (*Picea*). Sun. Good slow-growing or dwarf cultivars, including Norway spruce selections.

Yew (*Taxus*). Stands shade. Upright, spreading and dwarf cultivars. Japanese yew hardiest. All will probably need shaping.

### Broad-leaved

Azalea, especially Satsumi or Kurume types. Sun, part shade. Acid soil. Mounded form. Takes shaping. Many flower colors.

Barberry (*Berberis*). Sun. Glossy. Thorny. Takes pruning. Evergreen kinds include *B. candidula, B. julianae* and *B. verruculosa.* Flowers mostly yellow.

*Cotoneaster.* Sun. Most have red fruit. Mounded or trailing habit. Several spp. and many cultivars. Not all are evergreen, but many are persistent-leaved.

*Euonymus.* Sun, part shade. Excellent variegated forms. Upright, mounded, trailing habits depending on cultivar. Takes pruning.

*Longwood Gardens*

In warmer months the cloudy texture of *Juniperus chinensis* 'Torulosa' is complemented by a cascading underplanting of the annual variegated *Plectranthus*.

HOLLY (*Ilex*). Sun, part shade. Nearly all are dioecious. Japanese hollies, refined small leaves, often low and compact habit (*e.g.* 'Helleri'), black fruit; English and American hollies, red fruit; Chinese hollies, including compact forms, planted in South. All take pruning well.

GRAPE-HOLLY (*Mahonia*). Requires winter shade in North. Yellow flowers, blue fruit. Foliage plum-colored in winter. Use anti-desiccant in winter.

COMPACT CHERRY-LAUREL (*Prunus laurocerasus* 'Otto Luyken'). Glossy dark green foliage. Takes pruning. Tender in northern reaches.

*Pyracantha*. Sun. Orange or red berries, but red-berried types are usually not hardy northward. Mounded, pillar or standard forms. Some pruning probable. There are low-growing cultivars. Nearly all are thorny.

*Rhododendron*. Sun or part shade. Acid soil. Numerous dwarf or slow-growing kinds. Good foliage, flowers. Hardiness varies. Winter protection strongly suggested.

*Yucca*. Sunny, dry. Dramatic, spike-like effect. Good flowers. Several species.

### EVERGREENS FOR UNDERPLANTING

BEARBERRY (*Arctostaphylos uva-ursi*). Spreading habit. Red berries in sun. Dry, acid soil.

*Euonymus fortunei*. Sun, partial shade. Fine-leaved trailing cultivars. 'Minima' ('Kewensis') has tiny foliage.

IVY, ENGLISH (*Hedera helix*). Foliage

Longwood Gardens

An old wrought-iron pot, with rough pitted surface, contrasts handsomely with *Juniperus conferta* 'Blue Pacific' with its dusty-blue cast.

green or variegated, large or small depending on cultivar. Hardiness varies.

*Pachysandra terminalis*. Good in shade.

*Sedum*. Creeping small-leaved sorts such as *S. acre* (yellow flowers). Sun. Dry.

*Vinca minor*, also called periwinkle, myrtle. Dark green, fine-leaved trailer. Sun, part shade. Flowers usually blue.

### Annuals for Seasonal Underplanting

Ageratum, wax begonias, gazania, impatiens, lobelia, sweet-alyssum. Available in a range of colors. All combine well with vinca (above).

### For the South and Far West

Strawberry-tree (*Arbutus unedo*). Acid soil. There is a compact form.

*Camellia japonica* and smaller-leaved *C. sasanqua*. Many cultivars.

*Ceanothus*, California-lilac. Low-growing spp. and cultivars. Flowers blue or white.

*Eugenia, Syzygium*. Most spp. are classified now under the latter name, but Surinam-cherry (*E. uniflora*) remains the same. Handsome foliage.

Evergreen privet (*Ligustrum japonicum* and *L. j.* 'Texanum'). Attractive, tolerates poor soil.

*Nandina domestica*, sometimes called heavenly-bamboo. White flowers, long-lasting red fruit. Deciduous at northern end of range. Dwarf cultivars.

*Photinia* x *fraseri*. Sun. Vigorous new growth bright red.

*Podocarpus* spp. Has same role in mild climates as yew in North, but with bolder foliage.

### For Warm Climates, also for Indoor/Outdoor (Summer) Use in Cool Climates

*Ardisia crispa*. Good foliage, persistent red fruit. Takes some shade, tolerates potbound condition.

Asparagus-fern (*A. densiflorus* 'Sprengeri'). Trailing, fluffy.

Gold-dust-plant (*Aucuba japonica* 'Variegata'). Sun or part shade.

Natal-plum (*Carissa grandiflora*). Sun, shade. Glossy, rounded but spine-tipped foliage. Lovely white flowers. Edible red fruit. Takes pruning. There are low-growing, small-leaved and prostrate cultivars.

Citrus, various. Glossy foliage, fragrant flowers, colorful fruits.

Crotons (*Codiaeum* cultivars). Sun, part shade. Attractive foliage colors and forms. Dramatic.

*Fatsia japonica*. Large, glossy, dark green foliage. Attractive form. Part shade.

*Fatshedera lizei*. Hybrid between *Fatsia* and *Hedera*. Good green foliage, grows well.

*Ficus* spp., especially *F. benjamina*. Glossy, slightly waved foliage. Graceful plant.

*Gardenia jasminoides* 'Veitchii'. Sun. Acid soil. Fragrant white flowers, small foliage. Also trailing form.

Silk-oak (*Grevillea robusta*). Upright growth, feathery foliage. Takes pruning. Should be used more often.

Oleander (*Nerium oleander*). Hot, sunny, dry. Good foliage. Poisonous if eaten. Good flower colors. Many cultivars, some dwarf.

Sweet-olive (*Osmanthus fragrans*). Deliciously scented, small white flowers. *O. heterophyllus (ilicifolius)* has glossy, holly-like leaves.

Palms, various

*Pittosporum tobira*. Good foliage, good form, fairly slow-growing. The variegated cultivar is also attractive but more difficult.

Cape plumbago (*P. auriculata*; formerly *P. capensis*). Azure-blue or white flowers. Arching branches. Vine-like with support. Takes pruning.

Pomegranate (*Punica granatum*). Fine-leaved, glossy. Flowers orange-red. Attractive fruit. Takes pruning. Several cultivars, including a dwarf.

*Sedum*, various tender species. Sunny, dry. Some, like the donkey's-tail (*S. morganianum*), trail; others are clustered. Worthy.

*Skimmia japonica*. Shade. Upright grower. Long-lasting red fruit on female plants, but male needed for pollination. *S. reevesiana*, lower growing, has bisexual flowers and red fruit.

# NOTE ON FERTILIZERS

The home gardener or apartment dweller who grows plants in containers is apt to find two types of commercial fertilizer most practical for general use—water-soluble and slow-release. The numbers after the name indicate the percentage of available nitrogen, phosphorus and potassium in each fertilizer. Many preparations also include the minor elements.

Examples of water-soluble fertilizers are: Ra-pid-gro (13-26-13); Hyponex (7-16-19); and Miracle-Gro (15-30-15). They are clean and easy to use in the home or garden.

Slow-release fertilizers include Agriform (14-4-6), which is available in 3-gram tablets for 4-inch pots and 12-gram tablets for 6-inch pots to 5-gallon containers; Mag-Amp (7-40-6), coarse or medium type; and Osmocote, available in several proportions and varying in length of effectiveness. For example, Osmocote 14-14-14 is effective for 3-4 months while Osmocote 18-6-12 lasts for 8-9 months. The prime benefit of slow-release fertilizers is that less frequent applications are needed than with other types. However, be sure not to mix them with potting soil long before use, for moisture will cause release of the nutrients and shorten the period of effectiveness. As with all commercial fertilizers, follow manufacturers' directions.

Mention might also be made of one "organic" fertilizer that home growers also find effective: fish emulsion. This as well as the other fertilizers are available from most garden supply stores.

*Enjoyment on high. . .*

*Longwood Gardens*

# HANGING GARDENS

Nancy K. Collins

Growing plants in hanging containers can fulfill a variety of gardening needs—from aesthetic to practical. It can contribute to the efficient use of space and light while adding another dimension of beauty to an outdoor living area. Patios, porches, balconies and roof overhangs are often perfect summer sites for a hanging garden.

The primary consideration is choosing the right plant for the right place. Many factors enter into a choice, including available light, reflective surfaces nearby, temperature where the plant is to be hung and air circulation.

Plants which are placed high must be accessible for watering, pruning and periodic inspection for problems. There must also be thought of where excess water will drain. Because the weight of hanging containers increases many times when they are wet, a strong, reliable manner of suspension is essential.

Plants with a naturally pendulous form and a fast growth rate, such as cascade petunias grown in the full sun that they need, make the most immediate summer display. If plants are being chosen primarily for aesthetic purposes, decide what effect is desired—bright or subdued floral color, foliage or texture. Many possibilities exist and they should be considered in selecting the appropriate plants.

### Selecting the Plant

Geraniums, which require sun, are excellent in combination baskets where they can be placed in the middle with pendulous plants around the periphery. Sweet-alyssum with profuse white, pink or lavender flowers, is another plant for sun. It becomes pendulous if plants are grown around the exterior of a wire basket in addition to the top. Italian bellflower (*Campanula isophylla*), which has blue or white blossoms, is a tender perennial that

flowers from midsummer until frost. It can be easily propagated from cuttings started in early spring. Asparagus-fern, with trailing growth and delicate, graceful foliage, is a perfect candidate for sunny locations and is attractive with petunias. It can be started from seed in January or by division of mature plants. The variegated vinca vine (*V. major* 'Variegata'), which has light green and white foliage, combines well with other plants and is propagated from cuttings.

### On the Eastern Front

An eastern exposure provides a combination of cool morning temperatures and gradually intensifying sunlight that is satisfactory for many kinds of plants. It is ideal for wax and tuberous begonias, both of which are available in a variety of colors and forms. Young wax begonias are available in garden centers in spring. They may also be rooted from cuttings or started from seed. As with many plants, setting rooted cuttings around the exterior of a wire basket will provide an immediate show.

The flower shapes of tuberous begonias are many, including rose, carnation and picotee. Because the blossoms are large, bold and brilliantly colored, tuberous begonias are best grown by themselves; other plants cannot compete with them. Certain strains tend to be more pendulous than others and are better adapted to hanging containers. Tubers can be overwintered in a cool (45-50°) basement after the foliage dies in autumn. Check them periodically in winter and apply water if they start to shrivel. Storing the tubers in slightly moistened vermiculite in plastic bags retards drying out. When new growth resumes in the spring, pot up the tubers and keep indoors until all danger of frost is past, then move them to the garden.

Impatiens, of which there are dwarf strains, is also a plant for an eastern exposure. Young plants may be purchased in spring, grown from cuttings or started from seed. Impatiens should be acclimated to morning sun before making a complete transition from indirect light. Several colors are available. Achimenes makes an interesting and floriferous hanging plant. Its rhizomes, resembling tiny pine cones, should be planted slightly below the soil surface and kept moist until active growth begins. This is a prolific plant and after one season the number of rhizomes will more than double. They are stored over winter like begonia tubers but at a slightly higher temperature (55-60°). Other trailers for an eastern exposure are English ivy and fuchsia, both of which have many variants.

### Other Exposures

A western exposure provides good conditions for lobelia. The cascade varieties make fine hanging baskets, especially if they are planted around the outside of the container to give a faster show by covering the frame. Lobelia has a small, dainty flower which comes in a dark, violet blue or a pale, cool blue. Both colors are effective in different design schemes. Lobelia flowers from July to the end of the season if fertilized regularly. Browallia, another plant for a western exposure, has blue or white bell-like flowers. It flowers from midsummer until frost.

What about a site with no direct sun but bright indirect light? This would be good for coleus, which can be purchased as a young plant or started from seeds or cuttings. It can fill the need in a low-light area for either bold foliage color or subtle color, depending upon the variety. Impatiens also thrives in bright indirect light, as do English ivy and begonias. Tuberous begonias, however, do not produce as many flowers as in an eastern exposure.

### Assembling the Basket

Correct assembly and planting of the basket is essential to success. Wire-frame baskets or slatted plastic are preferred to solid plastic except in indirect light. The reason for this is that solid plastic tends to retain heat when exposed to the sun and the soil temperature, therefore, can become too high for many kinds of plants. Also, wire baskets lined with sphagnum moss allow aeration for the roots and a reasonably constant soil temperature. The wire baskets are available in many sizes

and shapes. Choose one according to the number of plants which will be grown in it and according to the vigor of the root systems. For example, a 14-inch wire basket would be adequately planted if three four-inch asparagus-ferns around the periphery and two four-inch geraniums in the middle were used.

Before planting, line the basket with coarse sphagnum moss. The moss should be thoroughly moistened in a bucket of water, then kneaded by hand. Squeeze handfuls into patties and place them on bottom of basket. Next, begin to line the sides. This will be more difficult because of the slope, but by firmly pressing the patties of moss together they will adhere. Line the bottom one-third up the wire form and then fill with potting medium to keep the sides from collapsing. Complete the upper two-thirds and add an ample roll of sphagnum over the top wire so plants can comfortably hang over the edge.

Now is the time to place into the sides of the basket those plants which aren't natural trailers. Begin by gently moving apart the layers of moss in the upper one-third of the basket exterior, using a sharp object if necessary. Make a hole only large enough to push the root ball through. The convenient plastic six-pack containers, available at garden-supply stores, are good for starting annuals from seed and they mold a small, compact root ball which is a perfect size for transplanting to baskets.

After the plant is in place readjust the moss so the planting medium cannot drain out. Plants should be in staggered rows along the upper two-thirds of the exterior. Additional ones should be planted in the top portion of the basket after the sides are completed. To complete a 12-inch basket with lobelia about twelve little plants are required—six around the exterior and six on top. With proper care, the basket will quickly be covered with foliage and flowers. Rooted cuttings work well and are easily planted into the sides of a basket after they develop a vigorous root system.

*Nancy K. Collins*

Multi-tiered baskets, suspended from the exposed beams, soften the angularity of the modern architecture.

Richard L. Tracy

A hanging basket of wax begonias, no matter what size, will brighten up a semi-shady to shady porch all summer long. (See p. 62 for more.)

### Potting Media and Plant Care

Soil-less media work best for hanging baskets because they are light in weight and provide good root aeration. Many ready-mixed, sterilized potting media are available. One which contains peat, vermiculite and/or perlite is preferable. Pour the medium into a bucket, add just enough water to moisten, and knead it until clumps are easily formed. Fill container. The plants should be set in the medium at the same level as (or slightly deeper than) they were in their previous container.

After planting, water the basket very gently and thoroughly. Gradually acclimate the plants to their new environment. Most of the plants mentioned in this article require moderate drying between waterings, which should be applied early in the morning. Water until drops begin to drain from the bottom. Fertilize with an equal-analysis fertilizer such as 10-10-10 at half the recommended strength every two weeks. For asparagus-fern a high-nitrogen fertilizer should be alternated with the equal-analysis fertilizer. Wet or mist the foliage only during the morning hours, especially with tuberous and Rieger begonias, which are subject to powdery mildew. Benomyl, a broad-spectrum fungicide, controls mildew.

The plants should be inspected regularly for insects and mites, which should be dealt with as soon as they appear. If infestation is minor a strong stream of water can remove some of the insects but it can also dislodge some of the plants. If infestation is severe, insecticides and miticides will be necessary. Malathion is effective for aphids, Kelthane for spider mites, and Isotox for mealy bugs.

Spray early in the morning, wetting the undersides of the foliage as well as the upper surfaces. Follow instructions on the package. Don't spray overhead, move the basket to a lower level. This is to avoid insecticide drift onto skin and clothing.

Prune off all dead flowers and foliage. Pinching may be necessary if the plants become lanky. This will encourage lateral growth and a fuller plant.

# CONTAINER PLANTS AND HANGING BASKETS

## Sound growing advice and good plant selections for year-round enjoyment in or out of doors

Everitt L. Miller

Ornaments of natural beauty can be created by carefully integrating plants and containers. Hanging baskets and container plants provide striking accents of color, form or texture for any location. It is no wonder, therefore, that container gardening and hanging plants are becoming more popular every year.

The art of growing plants in containers goes back in time at least as far as the days of the early Egyptians. Although no original containers have survived, it is possible to study the important role that flowers and plants played in Egyptian society by examining early tomb paintings. Plants were the chief source of decoration in the home and provided many forms for architectural ornamentation. The inside of a room often showed little but great bunches of flowers in decorated vases.

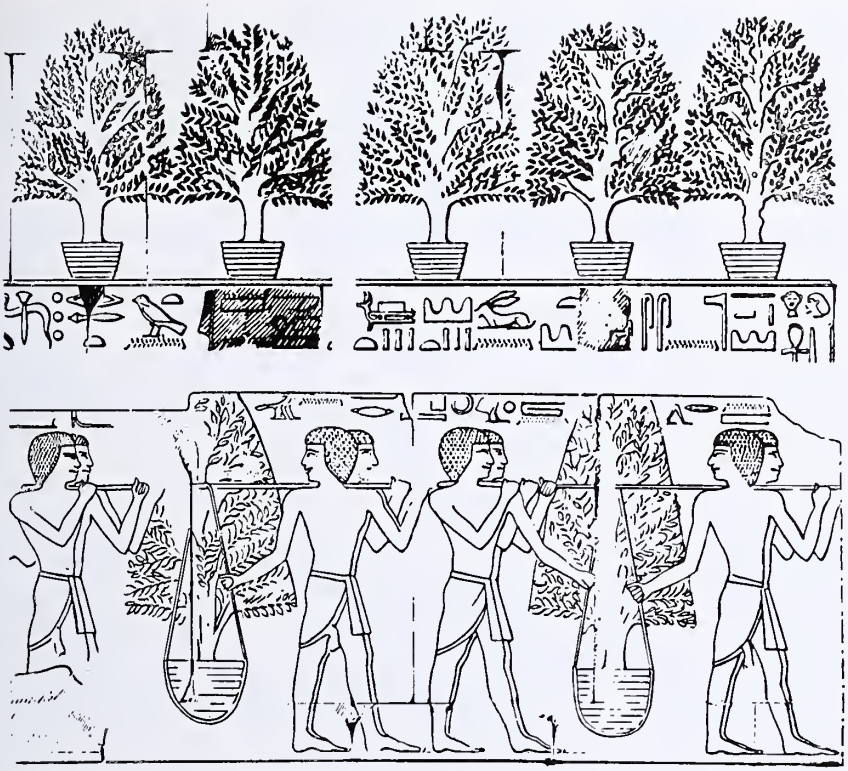
In Greece, it was not until the 5th Century B.C. that food was produced in plentiful enough supply to allow time for the cultivation of flowers for purposes other than religious ceremonies. While the literature of the Romans contains no references to container gardening at the opulent suburban villas and country estates of the wealthy, as houses in the cities became more cramped and the courtyards of old became too dark for flower growing, the Roman citizens began to garden in containers. They grew shrubs, vines, flowering plants and even trees in containers, placed on balconies, window ledges and rooftops.

### Modern Container Growing

In the last few years, container gardening has been staging a dramatic revival. Containers tie in beautifully with our contemporary architecture and casual lifestyles. The marketplace is filled with all sizes, colors, styles and shapes of decorative containers and hanging baskets. They are being used not only in homes, but in office buildings, shopping malls, city beautification projects, high-rise apartment buildings and dormitory rooms. Container gardening offers great pleasure and satisfaction to the apartment dweller, retiree, garden-club enthusiast and home owner.

There are a number of advantages in container gardening, but space consideration is the most important factor. Hanging baskets and containers require limited amounts of space and are ideally suited for small or restricted areas. They are flexible enough for use in houses, garden rooms, greenhouses and garden structures and on patios, balconies and porches. Hanging baskets may be suspended from eaves, rafters or from branches above the window which allow the plant to receive more light than it might in other situations. Two important considerations must be kept in mind before hanging the basket. It must not be hung so high that it is difficult to groom, water or view; and indoors a receptacle for the collection of excess water must be provided so that the surplus water does not drip onto furniture and carpeting. The ideal area for hanging baskets indoors is above some type of non-porous flooring, such as tile or cement.

While on the topic of watering, it should be mentioned that the good air circulation around hanging baskets causes them to dry out rapidly. Many times the small size of the basket in relation to the size of the plant also makes frequent watering and fertilization a necessity. To counteract the limited quantity of nutrients available in a small container leached by repeated waterings, hanging baskets should be fertilized regularly.



Gardening in containers is only a modern application of an ancient practice. These scenes, carved on the limestone walls of an Egyptian temple at Deir el-Bahri about 3500 years ago, show frankincense trees in containers being prepared for Queen Hatshepsut. (*From Naville, 1913*)

**Selection and Use**

The growth habit of a plant is a major factor in selecting plants for use in containers or hanging baskets. Plants are generally of upright or weeping habit. Those plants with upright habits are placed in containers while those with weeping forms are frequently used in hanging baskets. This is not an absolute rule, however; plants of upright habit can be trained to make beautiful hanging baskets just as weeping or trailing plants can be used effectively in containers. It is interesting to note that there are some annuals, perennials, vegetables and dwarf evergreens that do equally well in hanging baskets or containers.

Longwood Gardens attempts to display hanging baskets or containers that are original or unique to its operations. An interesting example is the adaptation of old split-rail fence posts to containers that can be used horizontally, vertically or as hanging containers (p. 18). Copper screen is attached to the bottom of the post holes. Sphagnum moss may be used to keep the soil from going through the screen. If the planter is used in the vertical position, wire must be used around the top and bottom of the post hole to hold the plant in place. Watering the vertical container is also difficult because the water runs off quickly. Even though sphagnum moss will help to retain moisture, the container should be watered frequently on sunny days. The soil mixture contains two parts soil, one part peat moss and one of perlite. A handful of rice-sized charcoal fragments can be added to sweeten the soil, help remove

excess fertilizer and supply drainage. Weekly fertilization with a well balanced water soluble 20-6-20 fertilizer will keep plants healthy and actively growing.

### Mums for Autumn Display

The chrysanthemum hanging baskets are among the most spectacular of the thousands of mums raised each year at Longwood for the autumn display. Success in growing these baskets depends upon the appropriate selection of chrysanthemum varieties and on the proper training of the plants from the time they are unrooted cuttings. Because of their long trailing habit, flexible stems and abundant flower production, mum varieties such as the white 'Anna', the yellow 'Jean Hart' and the golden-bronze 'Golden Pinwheel' are suitable subjects for a training regimen.

Cuttings of these mums are taken and rooted in February. In early March the rooted cuttings are ready to be transplanted into twenty-inch diameter stainless steel wire baskets which are custom-built by Longwood's maintenance staff. The baskets are lined with moist sphagnum moss and then filled with a soil mixture containing ten parts peat moss, six parts sterilized soil, four parts vermiculite, three parts sharp sand, and one-twentieth part lime. Ten well-rooted cuttings are placed in each basket. The tips of the cuttings are removed to encourage the development of two main shoots or leaders. As the leaders grow they are gradually tied to the spherical frame. The lateral branches are pinched weekly from the time of planting.

By May 15, when all danger of frost is past, the baskets are moved outside into an area of full sun. They will remain there until the end of September. A soluble fertilizer (20-20-20) is applied at one-third strength every watering, plus there is a bi-weekly application of full-strength fertilizer.

The mums are sheared weekly with grass shears. This shearing is discontinued around September 15 to allow the plant to initiate flower buds. The growth retardant, B-nine (0.37% solution), is applied after the final pinch and again in two weeks, if required. This controls the rapid vegetative growth and also encourages uniform production and arrangement of flowers.

Prior to being moved indoors in late September, the wire arms of the baskets are joined at the bottom to form a sphere five feet in diameter. In late October the baskets are moved into the main conservatory where they will flower profusely from early November until the first week in December.

* * *

Interesting and attractive hanging baskets* that I would recommend:

*Abutilon species* (Flowering-maple)
MALVACEAE

This genus contains a number of soft-woody shrubs well suited for use in hanging baskets. The maple-shaped leaves are the source of the common name. Most garden and greenhouse variants are forms of *Abutilon* x *hybridum*. The paper-thin bell or lantern-shaped blossoms appear throughout the summer in shades ranging from yellow to scarlet. The species *A. megapotamicum* 'Variegata' is particularly useful as a hanging-basket plant because of its more pendulous habit and mottled green and yellow leaves.

Abutilon grows rapidly and should frequently be potted on into larger containers as the roots expand. When the plant is in a ten-inch pot, allow it to become pot-bound for maximum bloom. A good potting compost consists of two parts loam, one part peat moss, and one part sand, with a complete fertilizer added three times during the growing season. Frequent applications of soluble fertilizer can also be applied as the plant is watered. Abutilon likes full sun, but the soil *must* be kept adequately moist or the plant will quickly wilt. It is easily carried over in winter in a sunny window of a cool room. To prevent legginess or sparse foliage, one should cut the branches back to hard wood each spring and pinch back new growth occasionally. These cuttings may then be rooted to produce new plants.

*Many of these plants can be used in a protected spot outdoors in summer if adequate shade and ample humidity are provided.

All photos, Longwood Gardens

Hanging baskets and, on pillars, fixed baskets complement the pots of chrysanthemums lining the walks during Longwood Gardens' autumn display.

*Achimenes species* GESNERIACEAE

These are among the toughest, as well as the most floriferous of the gesneriads. *Achimenes* are best started in early spring from rhizomes placed ½ inch deep in a peaty mix. The young plants should be pinched back when two to three inches high to encourage branching. They will begin to produce flaring, tubular flowers up to two inches across by June. This abundance of bloom will continue until frost. The leaves, although almost completely obscured by flowers, are a deep lustrous green with a purplish cast on the undersides. Flowers may be white, rose, pink, purple or violet, some being veined with a contrasting color. At Longwood, *Achimenes* 'Valse Bleu' and 'English Waltz' make superb specimens, both violet blue, with 'English Waltz' the darker of the two. 'Menuett' is a bright pink and 'Tarantella' is a coral pink.

In autumn, water should be gradually withheld until the plants wither. Dry the rhizomes and store them in a cool place over the winter; they do nicely in glass jars or paper bags in the basement. Replant them in early spring for another season of bloom.

*Aeschynanthus species* (Lipstick Plant) GESNERIACEAE

Grown as a houseplant, *Aeschynanthus* will bloom intermittently throughout the year. The two-inch-long, red tubular flowers resemble an opened tube of lipstick as they emerge along the three- to four-foot-long stem. The form and foliage of the plant is similar to that of Columnea, with deep green lanceolate leaves approximately ¾-inch long. *A. marmoratus* is grown for its green leaves mottled with maroon, while *A. speciosus* flaunts brilliant yellow and orange flowers

*Browallia speciosa* 'Major' in a dramatic chandelier at Longwood Gardens. Each flower in the chandelier is about 1½-inches across. The home gardener can make a similar (but undoubtedly more modest) cascading basket with peat moss and a sturdy wire frame.

up to four inches in length. Indoors, *Aeschynanthus* need good light, high humidity and high temperatures. They therefore require more than minimal attention but, if properly grown, make striking accents or specimen plants. If taken outdoors during the summer, *Aeschynanthus* should be given a protected, lightly shaded location. They need a loose, fibrous potting mix and must dry out between waterings.

*Asparagus densiflorus 'Sprengeri'* (Asparagus-fern) LILIACEAE

The asparagus-ferns are not true ferns, but they provide a foliage display equally attractive as their namesakes. Sprenger asparagus is one of the best for use in hanging baskets, with its gracefully arching stems cascading downward in lush, rich shades of green. The one-inch-long, needle-like foliage is heavily textured and borne in clusters along the stems. The plant grows vigorously from tuberous roots, and requires periodic pruning of old stems to renew its growth and to provide room for new shoots. It thrives in a soil mixture containing two parts loam and one part of an equal mixture of leafmold, peat moss and sand. Mature plants produce fragrant white flowers followed by bright red berries up to ½-inch across which ripen around Christmas. This plant is easily propagated from seed, which germinates in about four weeks, or by division. It should be grown in full sun or, where summers are hot, in partial shade.

*Browallia speciosa 'major'* (Amethyst-flower) SOLANACEAE

This perennial is usually treated as an annual but will live over the winter if brought indoors. It is a bushy plant, especially valued for its profuse clusters of 1½- to 2-inch blue, violet or white petunia-like flowers, which appear from mid-April on through the summer. The blue flowers often have white throats or eyes, making them especially attractive. Indoors, *Browallia* needs warmth, moisture and filtered sun. It is easily propagated from seed which may be sown inside as early as February. Seedlings should be thinned as early as possible and later transferred to individual pots; three plants per pot are usually recommended, and the shoots should be pinched regularly to encourage maximum bloom.

*Campanula isophylla* (Italian Bellflower) CAMPANULACEAE

With its trailing stems, light gray-green, heart-shaped leaves and abundance of star-shaped lilac-blue flowers, this plant is ideally displayed in a hanging basket. Treated as a tender perennial, *Campanula isophylla* thrives indoors year-round in a

bright window with limited direct sunlight. Plants do best when brought into flower in a cool greenhouse or room at a temperature not exceeding 60° F. Carefully grown, this species will flower profusely in early spring and again in late summer or early autumn. These plants need a well-drained potting mix of equal parts loam, sand and peat, and should be watered generously except during the winter, when only moderate moisture is needed. The cultivar 'Mayi' has pale blue flowers; 'Alba' has white flowers. For a striking effect, three may be planted together in a single basket.

*Episcia species* (Flame-violet) GESNERIACEAE

If high humidity is available, episcias make excellent hanging plants for a partly sunny window in a rather cool room. The flowers of *Episcia cupreata* resemble orange-red or yellow African-violet blossoms with long tubes or necks. The species *E. dianthiflora* is particularly striking with tubular white flowers heavily fringed at the edge. Although the flowers are quite attractive, episcias are often grown as foliage plants, for the striking patterns and intriguing color combinations found in the four-inch oval leaves. *Episcia cupreata* has deep copper-colored leaves, but the real show comes from such *E. cupreata* cultivars as 'Metallica' or 'Viridifolia', which have metallic foliage in shades of bronze, silver, chocolate, gold or pink.

Episcias should be watered only enough to keep the soil barely damp; in winter, allow them to become slightly dry between waterings. Fertilizer should be applied once a month when plants are growing vigorously. They are readily propagated from cuttings. However, as mentioned earlier, episcias will not do well unless a minimum humidity of 30% or higher is available.

*Plectranthus australis 'Variegata'* (Swedish-ivy) LABIATAE

This handsome ornamental is one of the easiest plants to grow in a hanging basket. It is a beautiful specimen when grown properly, but should not be allowed to get leggy, as it then quickly assumes a straggly, unkempt appearance. The terminal buds of each stem must be pinched back regularly to ensure full, bushy growth. Its thick, trailing succulent stems are covered with attractive, scalloped-edged, fresh green leaves with white margins and veining. *Plectranthus* flowers are white on long spikes, but these are not particularly ornamental; the plant is grown primarily for its foliage. Indoors, these plants should be grown in a bright window in a moderately cool room, with fairly high humidity. If this latter condition is unavailable, frequent misting will compensate. *Plectranthus* should be kept evenly moist and may need extra watering on hot summer days. They do well when moved to the shady garden during the summer and should not be fertilized more often than once a month.

*Plectranthus* is easily rooted from cuttings, so much so that you may soon find yourself inundated with this vigorous plant. A suitable compost is two parts loam with one part each of peat and sand.

Another handsome species is *Plectranthus oertendahlii,* with green to bronze leaves, which are slightly hairy above, purplish beneath, and with a network of light-colored veins. Both species make excellent hanging plants.

*Senecio mikanioides* (German-ivy) COMPOSITAE

This *Senecio* is one of those plants that generally thrives in the house when all else fails. It does quite well in a hanging basket with its fresh, green ivy-shaped leaves and twining habit. A compost of equal parts loam, peat and sand should be used, with dilute fertilizer added monthly during the summer. The plant should be watered only enough to keep the soil barely moist; this South African native is best grown near a window but out of direct sunlight. It thrives in cool conditions and will produce fragrant, yellow, daisy-like flowers if given some mid-winter sun. Cuttings are easily rooted in a perlite-peat mix in a warm, enclosed space.

*Stephanotis floribunda* (Madagascar-jasmine) ASCLEPIADACEAE

A twining indoor/outdoor plant, *S.*

*floribunda* is especially valued for the rich fragrance of its creamy-white clusters of 1- to 2-inch star-shaped flowers. These narrowly tubular blossoms are borne from April to October. The opposite leaves are a bright glossy green, slightly indented at the tip and about four inches long. Outdoors, *S. floribunda* does best in warm, light shade. Ideally, the roots should be shaded; the plant itself should be in filtered sun. The soil should be kept moist, and fertilizer should be added at regular intervals. Stephanotis winters well indoors in bright light, away from direct rays of the sun.

*Streptosolen jamesonii* (Marmalade-bush or Orange-browallia) SOLANACEAE

As a basket or container plant, *Streptosolen* is rarely seen indoors, which is surprising because it makes a magnificent specimen. In bloom from April through October, this plant produces loose clusters of trumpet-shaped, brilliant yellow-to-orange flowers up to one inch long. The foliage is quite attractive with ribbed, oval, evergreen leaves 1½ inches in length. A good potting compost consists of equal parts loam, peat and sand. Plenty of water must be provided during the growing season and then gradually tapered off during the winter months. *Streptosolen* should be fertilized weekly from April to October to ensure healthy growth and maximum bloom. After flowering, it is advisable to prune back the plant; cuttings taken in late spring root readily in a mixture of sand and peat. Indoors, *Streptosolen* grows best in a sunny window with average room temperatures and high humidity.

*Streptocarpus saxorum* GESNERIACEAE

As a member of the Gesneriaceae, *Streptocarpus saxorum* can withstand a great deal of abuse and neglect and still perform beautifully. The foliage and habit of *Streptocarpus saxorum* make it quite suitable for use in hanging baskets. The soft, furry-green, oval-shaped leaves are about ¼ to ½ inch in length and the tubular, light violet-blue flowers open to ½ inch across, and are produced in profusion in the early spring. The plant makes a terrific specimen in bloom, but is also attractive as a foliage-basket plant.

*Streptocarpus* likes relatively high humidity and should be misted regularly. It can, however, survive long dry periods; its limp-looking leaves will regain their turgidity within hours after being watered. The soil should be kept slightly dry and can be any light, porous growing medium. A sure way to kill *Streptocarpus* is by overwatering; the stems will begin to brown at the base and eventually rot all the way up to the tips. If this happens, the tips can be saved if cut off above the brown areas and repotted as cuttings. *Streptocarpus* is not a heavy feeder; a moderate fertilizer applied weekly is quite sufficient to ensure good growth and healthy bloom. Full sun is best from October through March; during summer months, Streptocarpus requires strong light but not direct sun. Daytime temperatures should be close to 70° F for flower production, but may drop to as low as 50° F at night. The plant is readily propagated by rooting cuttings in a mixture of sand and peat. *Streptocarpus* is a relative newcomer to the commercial market, and is worth trying for novelty's sake alone; if treated with minimal care, it should produce excellent results year round.

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Portions of this manuscript were prepared by graduate students in the Longwood Program in Ornamental Horticulture at the University of Delaware.

# HOUSE PLANTS OUTDOORS DURING SUMMER

## You may not be the only one who needs a vacation

Edmond O. Moulin

Anyone with a bit of space outdoors finds himself lured there when the weather becomes balmy. When the area is large there is of course a certain amount of permanent planting. In a very small yard, on the terrace or the patio, we tend to rely on potted plants, especially annuals or bedding plants, for our outdoor summer room. In autumn there is usually little of this investment that can be salvaged before the first frost, although a few cuttings from coleus, wax begonias, impatiens or geraniums can be brought indoors and rooted for next year.

Most house plants that are moved outdoors for a summer vacation seem to grow better there because of the fresh air and humidity, and the results are visible for months after they are brought into the home again. They are a "permanent" source of ornament for the indoor and outdoor areas. This benefits the owner's pocketbook, too.

I find it much easier to care for house plants outside. It gives them a boost and allows me a respite. Instead of plunging them pot and all in the ground, I get more satisfaction using them as I would indoors. The plants become part of an outdoor room when displayed in interesting containers.

It is important to wait until all danger of frost has passed in the spring before putting house plants outdoors. In my own garden I do not move them until the minimum evening temperature rises to 50°. For the first two weeks the plants are placed in filtered light so the foliage won't burn. I then gradually move the sun-lovers to brighter spots.

The indoor/outdoor plants I grow are dependable and readily available sorts, for I have little time or inclination to coddle prima donnas on a summer evening after a hard day's work. These plants give me a great deal of satisfaction with minimum attention.

### Attractive Pots Enhance Plants

If I had a goodly sum of money I would invest in containers because they can be as aesthetically important as the plants grown in them. Some of the Mexican pottery is beautiful, and sturdy when kilned properly. I have one shaped like a setting hen, which holds a medicinal aloe (*Aloe barbadensis,* formerly *A. vera)* and my eye is drawn to it on both summer and winter evenings because of the plant's mottled, spear-shaped foliage rising from the hen's back.

The aloe is attractive in the home in a sunny east window during cold weather and the juice its leaves contain is useful in alleviating the discomfort of a burned finger if I am careless in cooking dinner! In the summer the pottery hen is very decorative outdoors perched on a log in a sunny spot near the entrance gate to the patio.

Whether a container is directly planted or used as a decorative holder for the potted plant, it should usually have drainage holes. Some exceptions will be noted later. A few years ago I had a 2-foot-tall and equally wide Jerusalem-cherry in an 8-inch pot set in a Victorian urn which was kept indoors in a large sunny window and then put outdoors on the terrace for summer. Even though the urn did not provide drainage, I would raise the base of the Jerusalem-cherry pot by setting it on a smaller pot inside the urn. This would allow me to water for some time without worrying about stains in the home or leaving the base of the potted plant setting in water. A fatal mistake ensued, however, when there was a two-day downpour and I thought that the plant was safe under an open porch. The

Staten Island Advance

Bromeliads, asparagus-fern, false aralia and orchids, among others, all benefit from a summer outdoors. Remember, however, that plants, like people, can get sunburned.

wind-driven rain had filled the urn with water, and when I saw what had occurred on the third day it was too late for resuscitation.

### Water Culture in Containers

There are of course plants that will root in water and can remain growing in water in drainless containers. Among them are: Dracaena (*D. marginata* of the trade), spotted-evergreen (*Aglaonema costatum*), Chinese-evergreen (*A. modestum*), arrow-head-vine (*Syngonium angustatum* 'Albolineatum'), spider-plant

(*Chlorophytum comosum*) and umbrella sedge (*Cyperus alternifolius*).

The spider-plant makes an excellent subject in a hanging basket or suspended pot and can be grown as an aquatic or as a traditional potted plant. As an aquatic in a drainless pot, it is nearly worry-free. I display it outdoors in a semi-shaded location, suspended from a swivel-type wall bracket placed adjacent to a window. In this manner it can be appreciated indoors or out. In late August I move the hanging pot to a swivel support inside the same window.

Umbrella sedge greatly benefits from being grown in water, especially indoors. Evaporation helps raise the relative humidity of the air immediately surrounding the foliage. However, it is almost impossible to keep the water clear since unsightly algae develop rapidly. For this reason it is preferable to use opaque containers when growing plants in water.

### Other Containers

The half baskets and pots which are now available on the market are of special value because they allow use of wall space and permit vertical gardening with a variety of plants. These half containers can be used singly or back-to-back indoors and set on a table or hung most attractively on a wall outside. There are many cascading plants which are perfect in these containers. I have had very pleasing results with Swedish-ivy (*Plectranthus australis*) and asparagus-fern (*A. densiflorus* 'Sprengeri'). They are displayed in semi-shaded locations in combination with half pots of pendulous tuberous begonias. The outside wall of the house, a fence or even the garden gate can serve as supports for these pots.

A few years ago I picked up a large rectangular wicker basket for a pittance at a flea market. This basket lined with a thin layer of salt-marsh hay and then planted with geraniums always makes an attractive display. Every winter the geraniums, intact in their container, go into a cool, frost-free, dark basement where only enough water is applied to prevent shriveling of the woody stems. Each spring the geraniums are retrieved from winter storage and placed outdoors after danger of heavy frost has past. At first I water sparingly until new leaves start to develop, and then I feed every two weeks with a soluble fertilizer as directed by the manufacturer. (Early in the season the combination of plant and container looks worthy of the compost pile!) After a few weeks the patience of a phytophile pays off and the blooming basket merits a prime spot on a garden seat in full sun.

The small pottery baskets which have drain holes are interesting containers. However, the relatively small basket of the design employed for carrying cut-flowers holds little soil and is difficult to water. It also retains moisture poorly. Variegated lemon thyme (*Thymus* x *citriodorus* 'Argentea') performed fairly well for me in a small pottery basket for nearly a year but suffered from periodic dryness. When the thyme gave up, (rather when I gave up), I decided the container was more suitable for growing succulents such as the toy-cypress (*Crassula lycopodioides*). This plant has thrived on my occasional neglect and now dutifully cascades from its container, which is suspended from a low eave of the house.

My special fondness is herb fragrances which remind me of food. I am refreshed by the aroma of sweet bay (*Laurus nobilis*), especially when I transport it from a cool, sunny room to its summer home outside and then back indoors before the onset of winter. My sweet bay, which is the laurel of the ancients and the source of bay leaves, is planted in a hexagonal redwood tub. This slightly tender evergreen Mediterranean shrub is attractive either indoors or out, and pruning it in my home is no problem, particularly at dinnertime.

A final word on containers: For hanging pots, macramé pot holders of rot-resistant fiber are practical and decorative indoors and out. Well-cleaned clay pots become almost inconspicuous when displayed in them. The holders allow very efficient use of vertical space and can be suspended from the eaves of the house or even from a sturdy tree limb. Put your imagination to work with them and you will discover many uncommon uses.

*Window boxes for today's windows . . .*

# LOOKING FROM THE INSIDE OUT

Mary Hotze

Window boxes have been around for a long time. The classic type complements the double-hung window or the aluminum-frame, crank-out window. Today, architects may choose kinds of windows other than the rectangular ones. New windows give new possibilities for a panoramic view of the outside living area. Such windows also call for creativity in planters.

This discussion will take both situations into consideration: the classic window box and several new planter designs.

### Classic Window Box

Your window boxes should be sturdy and well attached to the house. They are more attractive if they blend with the color, design and construction materials of the house. If you make a box to blend with the house, it can be attractive even when empty. However, even during the winter months holly branches, bittersweet and evergreen boughs can reflect the season through your windows.

Five pieces of wood (1 x 8's or 1 x 10's) are nailed together for the ends, side and bottom. Use waterproof epoxy to glue the points and apply a preservative to finish the inside, choosing one that is not harmful to plants. The inside can also be waterproofed by painting with roofing asphalt or by inserting a metal tray in the box.

If you plant directly into the box, be sure to select flowers which have a long blooming season. In order to maximize use of your window boxes, it's probably a better idea to put potted plants inside the box—a type of double potting. Watering is made easier this way, especially if peat moss is packed around the pots or if the box serves as a pebble tray. Peat moss or a pebble tray holds moisture and helps keep the pots from drying out quickly. By using pots, as one variety declines you can also easily put new plants into the box to correspond with the season.

### Planter Wall

Colorful planter walls can function as an accent or focal point as you view them from the inside. The planter can also serve as a patio divider or as a screen to provide outdoor privacy.

Materials Needed:

1. 2" x 4" boards, length dependent upon the size of planter desired.
2. 2" x 4" galvanized wire mesh.
3. 6-millimeter black plastic sheeting over twice the size of the planter.
4. ½" - ¾" metal staples.
5. ¾" diameter polyethylene water pipe, length and height of planter.
6. One ¾" plastic plug, one ¾" plastic ell, 4 hose clamps and a ¾" female hose connector.
7. The growing mixture needed could be a self-mixed medium (see discussion of soils) or a commercially prepared medium. To calculate the amount of soil mixture needed, follow this example.
   Volume = height x length x depth (thickness) x (conversion factor)
   = 48" x 96" x 1 ft.$^3$ (or 1728 in.$^3$)
   = 10.6 or about 11 cubic feet of growing mix.

Construction:

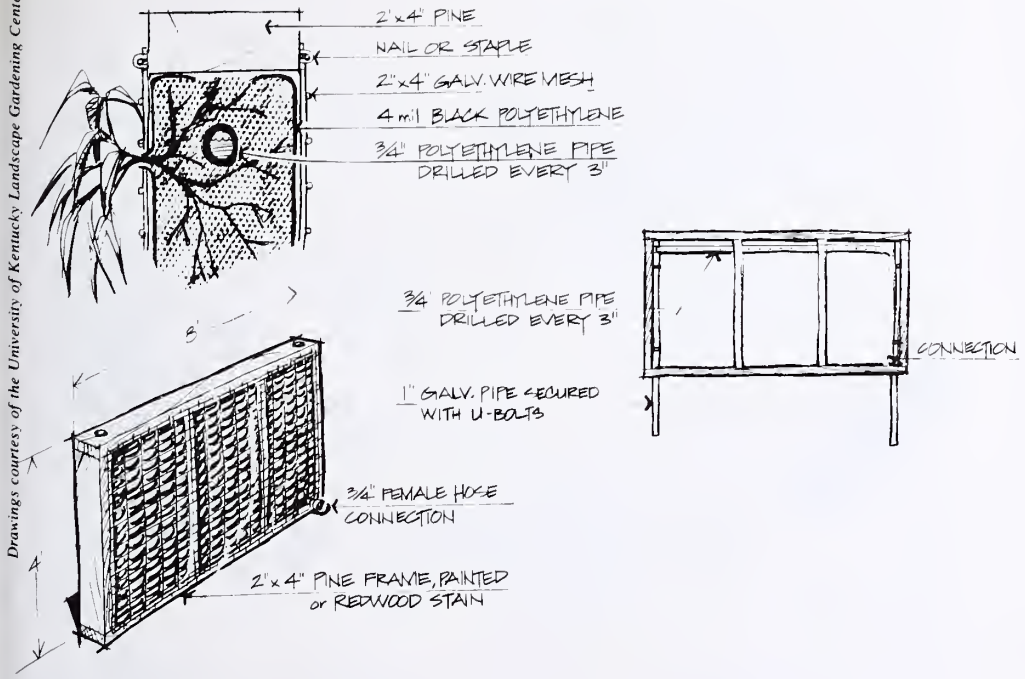
The planter is constructed of 2" x 4" boards which can be painted or stained. Make the planter this way:

1. Frame of 2" x 4" boards (see diagram.) Match the two upright center boards and the lower board so the ¾" pipe will fit inside.
2. Cut the ¾" polyethylene pipe into two sections: (a) one the length of the planter; and (b) one the height of the planter.
3. Perforate the horizontal pipe with a ⅛" drill every 3 inches.

This information is based on experimentation at University of Kentucky's Landscape Garden Center by Mr. Hugo Davis and Dr. Robert Anderson.

Drawings courtesy of the University of Kentucky Landscape Gardening Center

DIAGRAM FOR PLANTER WALL


2"x4" PINE
NAIL OR STAPLE
2"x4" GALV. WIRE MESH
4 mil BLACK POLYETHYLENE
¾" POLYETHYLENE PIPE DRILLED EVERY 3"
¾" POLYETHYLENE PIPE DRILLED EVERY 3"
1" GALV. PIPE SECURED WITH U-BOLTS
¾" FEMALE HOSE CONNECTION
2"x4" PINE FRAME, PAINTED or REDWOOD STAIN
CONNECTION

4. Plug the upper end of the ¾" pipe with a ¾" plug, install ¾" ell and a ¾" female hose connection. Tightly apply hose clamps on all joints.
5. Cut two pieces of 2" x 4" galvanized wire mesh the size of the planter.
6. Staple one piece of the wire mesh onto one side of the planter. Use ½"-¾" staples.
7. Turn the frame over and line the inside of the mesh with 6-millimeter black plastic.
8. Fill the planter level with growing mix.
9. Wrap the plastic around the mix and staple the other piece of wire mesh firmly into place.

INSTALLATION:

Methods vary with preference and use. If you do not want the planter resting on the ground, follow this procedure. When constructing the frame, bolt two pipes onto the inside upright frames and allow them to extend out the bottom (see diagram.) Insert two pipes of larger size into the soil and imbed them in concrete at intervals that match the pipes on the planter, which will then fit down in the ground pipes. You can use bolts to adjust the planter to the height desired. This also allows for removal of the planter for winter storage if desired.

HOW TO PLANT:

This planter is designed for plants to be set on both sides.

1. Slit the plastic where you desire a plant.
2. Move the soil back with your finger and insert a young plant.
3. Firm the soil around it.
4. After planting, hook a garden hose onto the female hose connection and water the planter gently until it is dripping water. Caution—water the planter well originally. If the planter is wet and a single plant appears to be dry, water it separately by hand. Soon the plants will have expanded root systems and the internal mechanical watering will suffice. Observation will indicate when it needs watering.

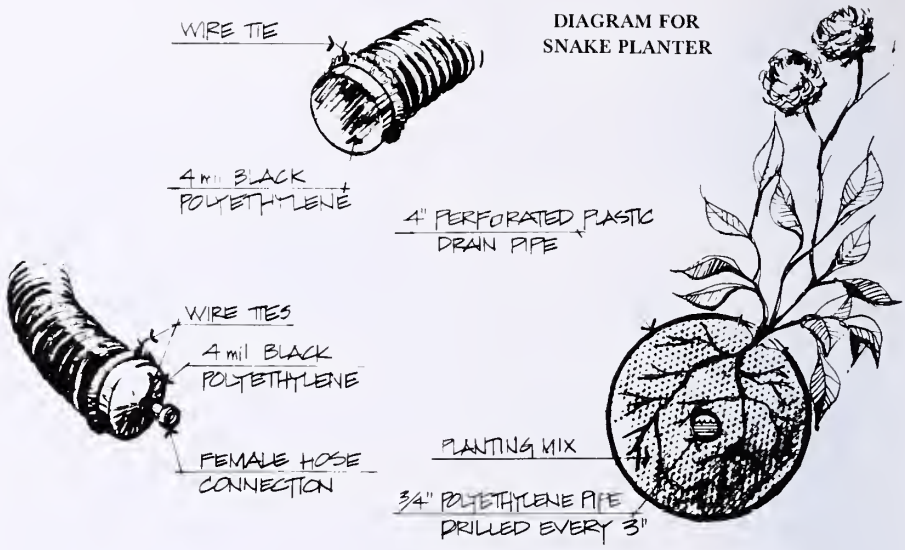


DIAGRAM FOR SNAKE PLANTER

### Snake Planter

Due to fear and misunderstanding, serpents have long been avoided! Here is a colorful "snake" you can not afford to miss.

MATERIAL NEEDED:

1. 4" diameter corrugated plastic drainage pipe.
2. ¾" flexible polyethylene water pipe.
3. One ¾" plastic plug, one ¾" female hose connector and 2 hose clamps.
4. A piece of 6-millimeter black polyethylene plastic large enough to cover the ends of the 4" pipe.
5. Wire to wrap around the plastic to cover the ends of the 4" pipe.
6. The growing mixture again should be light weight. Check discussion of soils.

CONSTRUCTION:

The planter is made from 4" perforated, corrugated plastic drainage pipe.

1. Cut the length of 4" pipe desired.
2. Cut an equal length of ¾" polyethylene flexible water pipe. Drill a ⅛" hole every 3 inches.
3. Install a ¾" plastic plug and a ¾" female water hose connector to the ends of the pipe. Secure tightly with hose clamps.
4. Insert the ¾" pipe inside the 4" pipe.
5. Fill the 4" pipe with growing mixture. If the pipe is long it may need filling from both ends by holding them up and putting in the growing mix.
6. Cut 6-millimeter black polyethylene plastic to fit over the ends of the 4" pipe. Fasten the plastic with wire.

INSTALLATION:

1. The "snake" can be hung on a fence or wall by using heavy wire to form S-shape loops that fit around the 4" pipe and around another support.
2. After hanging the planter, use a knife to cut holes through the top of the planter where plants are wanted. The holes need to be large enough to allow room to set young plants into the pipe.
3. Insert plants.
4. Water the "snake" by connecting the hose to it. The perforations of the pipe will allow good drainage, so do not be stingy with water. Keep a close watch on the plants until they have become well established.

How to calculate the volume needed:

Volume = Area of the circle x length of the 4″ pipe
= $4^2$ x length
= 3.14 x 4 sq. in. x 30 ft. x 12″
= 2.6 cu ft.

Plants that have performed well in these planters are:

Wax begonias (*Begonia semperflorens*). Sun or shade (4″ x 6″ spacing).

Snapdragons (*Antirrhinum majus*), dwarf types. Sun/part shade (4″ x 4″).

Madagascar-periwinkle (*Catharanthus roseus*; formerly *Vinca rosea*). Sun or shade (6″ x 6″).

Impatiens (*Impatiens wallerana*) low-growing kinds. Shade (4″ x 6″).

Dusty Miller (dwarf gray-leaved forms of *Artemisia, Centaurea, Senecio*). Sun (6″ x 6″).

Cup-flower (*Nierembergia caerulea*). Shade (4″ x4″).

Coleus (*C. blumei*). Shade or part sun (6″ x 6″).

### Soils for Boxes and Planters

Plants grow best in containers that contain a good garden soil and amendments. A standard container mixture should contain equal parts of sterilized garden soil, peat moss or compost, and perlite, coarse sand or calcine clay. These three components form a mixture that has good water-holding capacity (soil, peat moss), good nutrient-holding capacity (soil, peat moss), and good air-holding capacity (perlite, peat moss). The proportion of peat moss and perlite in the mixture should be increased if poor garden soil (such as clay) is used. Likewise, less peat moss is necessary if the garden soil has been improved by additions of compost, composted manure, organic mulches or peat moss in previous years. Add a larger proportion of sterile soil (up to 50%) to the mixture used in previous years. Add a larger proportion of sterile soil (up to 50%) to the mixture used in large boxes or planters that are more than 14 inches deep.

Most annuals raised and sold by commercial greenhouse operators are grown in soil mixes with only 5-15% soil or completely soil-less (artificial) media. Commercially prepared, packaged soils sold in garden centers, florist shops and department stores are soil-less media. Soil-less media have been developed by the floriculture industry to facilitate automated-production watering, fertilization, handling and shipping. Soil-less media have all the qualities desirable for plant growth, but their physical characteristics and care are different enough from soil mixes to cause cultural problems for many gardeners.

Brookiyn Botanic Garden

# HERBS OUTDOORS AND IN

## Why not enjoy them both ways?

C. Roy Boutard

In spring it is possible to pick fresh outdoor-grown herbs a month earlier than usual if they are grown in a sunny window box. Sage and winter savory lend themselves to this use, as do other frost-resistant sorts such as parsley which benefit from an early start. Avoid heavy containers. An inexpensive rot-proof fiberglass box, holding the light-textured soil herbs enjoy, can easily be taken indoors on a cool evening.

If during the summer you do not wish to grow a whole garden of herbs but desire just a few to add flavor to meals and to decorate a patio, almost any kind of container will do, as long as it has drainage holes. Choices might include a redcedar window box or clay pot, horse trough, wash basin, cheese box or an old hollow apple tree stump. Excellent planters of any shape can be made by mixing sand, cement and coarse stones, then using a hole in the ground as a mold.

Aggressive plants such as the mints are best grown in containers to restrict their ambitious root systems. In autumn they can be removed from the containers and overwintered in the ground, then divided and repotted in spring. Rosemary and other tender plants that you may wish to bring indoors come autumn are always best left in a pot during summer.

The main problem with moving herbs into the home for winter enjoyment is to bring them in early enough, before really cold nights set in, so that they can become acclimated to the room atmosphere before the oil burner starts roaring. Herbs such as basil and marjoram strike roots very easily, so it is best to take cuttings during August for winter use, rather than struggling with large plants.

Whenever plants are grown in containers, indoors or out, remember that they are at your mercy. They cannot send out roots and forage for themselves as do ones in the ground; they are entirely dependent on you for water and fertilizer. Unless they are in a very large pot it is cruelty to grow large-rooted and vigorous plants such as angelica, bee-balm and the taller kinds of sages.

### Among the Best

At the Berkshire Garden Center we have had the greatest success with the following herbs in containers:

LITTLE-LEAVED BASIL (*Ocimum basilicum* 'Minimum'). This type grows smaller than the common sweet basil and does not become so coarse as it ages. Like the other it is a tender annual but can be perpetuated for winter use indoors.

SALAD BURNET (*Poterium sanguisorba*). A tidy compact plant usually growing to not more than one foot. It has attractive leaves and dainty green or purplish-tinged flowers. Salad burnet is a perennial in spite of its shallow root system.

CHIVES (*Allium schoenoprasum*) give a grass-like effect in a planting, and the purple flowers which appear in the latter part of spring last a long time. Potted divisions can be brought indoors in autumn for kitchen use. Flat-leaved or garlic chives (*A. tuberosum*), a taller perennial with white flowers in late summer, is excellent—and so hardy we have had it sitting outside all winter in containers without any protection. *Allium senescens glaucum*, a low grower with spirally twisted gray leaves and rose-colored flowers in late summer, is also very good.

LAVENDER (*Lavandula angustifolia*), with narrow gray leaves, is attractive even when it is not in bloom, and will tolerate occasional drying out. Flower spikes appear in late spring and early summer. There are compact-growing forms for smaller containers. Plants tolerate clip-

Both photos, George Taloumis

Clockwise from top left: golden sage, tricolor sage, curly parsley, sweet marjoram and sage are just a few of the herbs that do well in containers outdoors.

ping well only in areas with a long growing season.

WILD MARJORAM (*Origanum vulgare*). When it grows unrestricted this perennial seems very rampant, but it is less so in a pot. Wild marjoram flowers very readily with lots of clusters of pink flowers in the latter part of summer.

PARSLEY (*Petroselinum crispum*). One of the best herbs for containers. The curly-leaved varieties give an interesting texture to a planting and are ornamental in their own right. Only young, freshly started plants should be brought indoors in autumn for kitchen use.

LEMON-VERBENA (*Aloysia triphylla*; formerly *Lippia citriodora*). When our plants were growing happily in the open ground they produced beautiful leaves for a most refreshing tea, but never any flowers. However, when we placed one in a bushel basket lined with plastic it bloomed profusely with pretty little white flowers. Lemon-verbena is a subtropical shrub and must be over-wintered indoors in the North.

**Herbs Indoors**

Generally, herbs are not the most suitable plants to grow indoors for, in order to become tasty, the majority need excellent air circulation and plenty of hot sun, conditions which are difficult to provide during our winters. In addition, most require a light, well drained, sandy soil.

If, however, you are determined to tackle indoor herb growing, it can be done. Choose either a large bay window with lots of light or a sunny window with a wide shelf. Herbs need a good amount of room. Unlike jungle plants which do not mind socializing by rubbing leaves and shading one another, they are better off not touching each other.

Being a plant-window enthusiast, I find the protruding sorts of miniature greenhouses ideal because they receive light from three sides, sufficient moisture, and can be ventilated with fresh air on warm days. Herbs are most conveniently grown here in individual pots embedded in peat moss or a very light soil. Each plant can then be removed for de-lousing in the sink if need be. (Lemon-verbena is especially prone to whitefly and may need washing quite often.)

Variegated sage and chives, the latter with its purple flower heads, are easy to grow and brighten the steps or any sunny spot in summer.

Two of the quickest and easiest herbs to grow indoors are the vitamin-rich CRESS or PEPPERGRASS (*Lepidium sativum*) and BLACK MUSTARD (*Brassica nigra*), both of which have been cultivated since ancient times. The plants are eaten in the seed-leaf stage. All that is needed is a box or pot with a friable soil of a depth of two or three inches, and good drainage. Sow the seeds thickly on top of the soil and press them down firmly with a board. If soil is put on top they become difficult to separate later on and when eaten remind you of unwashed clams!

Cover the container with plastic or glass until germination has taken place. After ten to fourteen days you can cut off with scissors a sharp-tasting delightful herb which will add zip to any fresh salad. If allowed to grow a few days longer they become hotter and tougher. If you wish to grow the mustard and cress together in the same box, sow the mustard four days later as it germinates quicker. After cutting, throw the soil out and start with a fresh lot. The seeds will germinate under quite cool conditions (55°) and can be grown all through the winter on any sunny windowsill.

Two woody herbs can be grown very successfully indoors. ROSEMARY (*Rosmarinus officinalis*) is a great little shrub which can be easily shaped by pruning to become a small tree or an espalier. It will bloom in early spring with attractive blue or white flowers. Variety 'Prostratus' will trail over the edge of the pot. Rosemary thrives in a cool, sunny position and enjoys an occasional misting. It must never completely dry out.

SWEET BAY (*Laurus nobilis*) is another choice shrub which, when fully grown, can easily spare a few leaves to flavor a stew. Bay, like rosemary, should spend its summers outside and be taken indoors in mid-September and placed in a cool room. It is never a cheap plant to buy as it is difficult to germinate and cuttings take up to six months to root. Rosemary is much easier to propagate.

SCENTED GERANIUMS (pelargoniums) are interesting to grow as they are pleasant pot plants which produce a great variety of fragrances. You name the scent: nutmeg, ginger, lemon, camphor; among the hundreds you are bound to find your favorite, against which you can rub your nose all winter. When the plants become too large, which happens especially when released in the garden in the summer, take slips to rejuvenate them. Two other herbs with scented foliage, WINTER SAVORY and MARJORAM, grow well indoors and seem to enjoy room culture. They both look attractive in pots or shallow bowls and are very useful ingredients in cooking.

*Practical lessons in beautification . . .*

# MUNICIPAL CONTAINER PLANTINGS IN VICTORIA

Alan I. Smith

The trend toward growing plants in containers is especially noticeable in the drab and sometimes sterile environment of our cities. To me, nothing seems to symbolize the revitalization of downtown areas better than plantings which can be developed to create a more relaxed atmosphere and one that takes away the hard edges of city life.

In Victoria, British Columbia, where I am Superintendent of Park Maintenance, we have placed containers on the lampposts every year since 1936. Gradually, our container growing has expanded to embellish streets, squares, greens and other places so that these once naked areas are now garnished with annuals, shrubs and trees.

When we think of containers, our minds envisage the well-known clay pot. However, containers can now be found in a wide range of materials, shapes and sizes. Containers are selected for each instance to provide the most aesthetic situation when combined with appropriate plants. For instance, a large concrete container 3 ft. high and 5 ft. in diameter could present a starkness in itself if it were planted only with a single tree. It might also encourage people to use these units as garbage receptacles. Consider the same container still with a tree in the center but complemented by some upright evergreen and flowering shrubs, with trailing plants or annuals to break up the monotony of the somber gray walls of the container. This then presents a vastly different outlook and commands respect as well as appreciative glances from passersby.

### Containers for Downtown

The combination of size, color and shape is limited only by one's own imagination. We have adopted various types of containers for downtown areas: painted concrete 3½ ft. x 3½ ft. x 8 in. deep, 18 in. x 4 ft. x 8 in. deep for curbside sidewalk planters, hexagonal planters in 4, 5, and 6 ft. diameters with an internal depth to 18 inches, used as singles or multiples, and wooden planters of various sizes and shapes used in conjunction with seating. The wooden planters for annuals have a small metal insert to provide only 1 ft. of soil depth; ones for shrubs have metal inserts that extend 15 to 18 in. deep, while those intended for trees or large shrubs could have inserts up to 3½ ft. deep. All have drainage holes.

In Victoria we also use containers made of wood and held together by four long bolts, two on each side, which allows for ease of emptying and replanting. This container has no metal insert.

With the curbside containers we have adopted a system of inserts made of wood lifted out by two men with baling hooks. This allows us to change inserts for various seasons. Spring inserts contain English daisies (*Bellis*), pansies, crocus, daffodils, tulips or shrubs and crocus, among others. Summer inserts consist of various combinations of annuals. In autumn and winter, or as needed between seasons, various shrubbery displays, usually evergreen, are used.

The larger, more fixed containers are planted with basic features; seasonal changes are made to provide appropriate color much in the same manner as a home gardener would tend his own open borders or beds. All of the larger containers are moved by a fork-lift apparatus or by a light tractor whose bucket is fitted with two forklike extensions. The larger containers are placed empty and filled with soil on site, then planted.

### Soil Preparation and Care

The soil mixture for these containers starts with a good fibrous loam, usually composted sod. To this is added three parts peat, two parts coarse sand and three parts leaf mold. Fertilizer is not added to the compost but is placed on the

surface after all planting has been completed. The fertilizer used is a slow-release sort, Osmocote 14-14-14, which will be effective for the bulk of the season. The only deviation from this routine is in the feeding of hanging baskets. A 20-20-20 soluble fertilizer is added to the water in every sixth watering.

Watering for the street containers is done mainly by a tanker truck. In most months crews work two shifts, covering 5 AM to 10 PM, but in midsummer crews work three shifts, 24 hours per day. We have our own tanker units set on a truck deck (500 gal. units).

The larger containers are watered by hose and key tap receptacles placed in the sidewalks. Some large fixed containers have automatic watering devices consisting of a valve pressure reducer (set at 10 lbs.) and sections of spaghetti piping fitted to ¾ in. plastic water pipe (trickle irrigation). These are turned on in spring and off in autumn. The piping used is placed under a coarse mulch so it is not prone to vandalism.

The flower baskets are watered six nights a week by a driver operating a pump-driven hose, the business end of which is formed into a "shepherd's crook" type of fitting. Inside the top of the basket, before the final planting takes place, a 2-in.-deep metal collar is placed. This tends to force the water down through the basket so it does not flow over the sides. The basket also has a basin attached to the base to provide a reservoir from which it draws moisture during the day. The water truck is equipped with two sets of driving gear—steering wheel and foot controls. This allows us to water baskets placed on one-way streets and still use only one man.

For offices and reception areas we have tubbed plants up to and including palm trees 15 ft. high, with special waterproof trays for holding the tubs. These trays, equipped with casters, present few problems in watering and moving. Indoors, the cleaning of dust from these plants is necessary at least three times a year.

For outside recessed windows of large old commercial buildings, as well as City Hall, we supply at cost window box plantings which are changed twice a year. We also water and maintain them for individ-

Attractive containers and a varied choice of flowers and evergreens provide year-round interest and bright summer color.

*All photos: City of Victoria, B.C.*

The right-hand steering wheel permits the operator to both drive and use the "shepherd's crook" watering wand.

ual businesses that want the same kind of containers to embellish their buildings. For all container plants other routine functions are carried out as in a normal garden, *e.g.*, spraying, pruning, staking.

Although the above features have been developed within an urban environment, there is no reason why they cannot be adapted to commercial developments as well as home use. To do this, keep in mind that containers: (1) should be chosen to fit in with your decor—oversizing can be ugly; and (2) require close supervision of watering and fertilizing. In choosing plants, especially shrubs for smaller containers, remember that the dwarf or slow-growing kinds will allow you the maximum time between changes.

Downtown Victoria, with its extensive plantings, becomes a much pleasanter place to wait or stroll.

*Container gardening is very practical. . .*

# FOR THE HANDICAPPED AND ELDERLY

Joseph E. Hoffmann

The handicapped and the dwellers in high-rises for the elderly are among those who are taking enthusiastically to container gardening. "You can baby those plants in the containers," says George Reilly, whose experience in gardening is only four years old.

Before that, Reilly thought the only practical place to get produce was in a grocery store—mainly because he ran a successful grocery store in the town of McMechen, West Virginia. The grocery store was sold, and multiple sclerosis struck Reilly. For about three years his hobby was sitting in his chair along the main street of McMechen greeting his friends and talking. Reilly discovered that was a poor way to exercise.

Gardening started when he accumulated a collection of discarded rugs—nine by twelve being the preferred size. The rugs were laid out in the spring, holes were cut for plants and the uniquely mulched garden became Reilly's exercise plot. The wheelchair took him to the end of the concrete walk, a walker supported him as he worked his way to the rug, and kneepads cushioned his knees as he planted and weeded, rested and relaxed in the sun.

Container gardening came when Reilly discovered that it was easier for him to tend plants this way. Also, home-grown vegetables, Reilly learned in the process,

Photos: J. Hoffmann

taste better than store-bought ones. This spring a whole row of 10-inch clay pots lines his backyard walk.

### High-rise Gardening

Container gardening in the high-rise progressed slowly until an enthusiastic gardener, Francis Hamm, moved in. He is the kind of nature lover who can take a person on a bird-and-nature walk when just standing still on the eighth-floor balcony of an efficiency apartment.

There were plenty of plants in the high-rise when Hamm moved in, but they were mainly African-violets and other indoor greenery. A different philosophy from growing house plants is involved in vegetable gardening on high-rise balconies, as Hamm's neighbors learned. In vegetable gardening there is a beginning and end—a goal. There are also very tangible rewards.

Hamm's enthusiasm has been communicated to others. He can grow a mess of leaf lettuce in a cardboard box a foot square and, when he recounts the feat, it sounds as though that box were the Imperial Valley of California.

Now boxes of tomato transplants have their place on the indoor plantstands in apartments with a southern exposure, which provides the sun most vegetables require. These will be distributed to neighbors who ask for them. Tomatoes are by far the most popular vegetable—one plant in a big wastebasket or a 20-gallon garbage can, decorated of course, can keep one person in tomatoes all season.

Meanwhile, at George Reilly's container garden, he is looking for a "garden sitter" for the vacation time this summer. Last year he went away for two weeks, leaving a flourishing cucumber vine in a box on his driveway. When he returned, the soil was dust and the vine was dead. An occasional loss is inevitable in any kind of gardening, especially with containers, which need frequent watering, but it does not dampen the enthusiasm of Reilly and his neighbors. The successes simply become all the sweeter.

Left: George Reilly and his eggplants. By inspecting his container plants regularly, he finds pests quickly and cuts the use of pesticides to a minimum. The corn in the background is planted in his rug mulch. Right: One or two tomato plants produce enough fruit for an efficiency apartment (plus a few guests).

# Vegetables for Containers

In recent years many vegetables have been bred to size for container gardens. The yields vary from modestly rewarding (peas, beans, cabbage) to very rewarding (cucumbers, lettuce, tomatoes). Most require a good amount of sun for best results. Chard, kale and looseleaf lettuce, all of which tolerate light shade, are good for cutting a few leaves at a time and will last long into autumn, though the gardener will want to raise successive crops of lettuce.

Several lettuce varieties, especially red-leaved 'Ruby', are ornamental in their own right, as is rhubarb chard, which has red stalks and foliage that becomes maroon when nights are cool. For a tomato plant, 'Tiny Tim' is most attractive. Here is a brief list of varieties suitable for containers. Check major catalogs routinely because new varieties are always being introduced.

Representative varieties include:
*Cabbage:* 'Dwarf Morden', 'Little Leaguer'. *Carrot:* 'Baby-finger Nantes', 'Goldinhart', 'Little Finger', 'Short 'n Sweet', 'Tiny Sweet'. *Cucumber:* 'Bush Whopper', 'Cherokee 7', 'Patio Pik', 'Pot Luck', 'Spacemaster'. *Eggplant:* 'Morden Midget'. *Head lettuce:* 'Tom Thumb'. *Musk melon:* 'Bushwhopper', 'Minnesota Midget', 'Short 'n Sweet'. *Peas:* 'Mighty Midget'. *Peppers:* 'Bell Boy', 'Yolo Wonder'. *Radish:* 'Champion', 'Cherry Belle'. *Squash:* 'Baby Crookneck', 'Creamy', 'Golden Nugget'. *Tomato:* 'Patio', 'Pixie', 'Sweet 100', 'Tiny Tim'.

Left page: cherry tomatoes in hanging basket for eye and taste appeal. Top left: compact 'Pot Luck' hybrid cuke; top right: everbearing strawberries; ctr.: dwarf-leafed squash in container; bottom: lettuce, a particularly satisfactory container vegetable.

*Top left: Petroseed; center: Old Westbury Gardens; others: George Taloumis*

*The old standbys are. . .*

# FAVORITE CONTAINER PLANTS FOR THE NORTHEAST

Rhoda S. Tarantino

For dependable flowering plants in sunny locations, we think at once of top favorites—garden geraniums, single-flowered petunias and low-growing kinds of marigolds. All are colorful, tolerant of dryness, and long-lasting if given care: extra water in drought, grooming as flowers and leaves go by, and feedings every other week. Ample and extended flowering comes also from lantana and verbena, if pruned back.

Fuchsias, tuberous-rooted begonias, impatiens and wax begonias are popular in part shade. Provide them with a soil abundant in humus and place them in an area with good air circulation.

Fuchsias and tuberous-rooted begonias require all-day shade in July and August because the summer sun, which is intense even in the North, may burn foliage. Experienced gardeners know they must use compost-rich soil to help retain proper dampness. A note of caution is called for when buying pre-started plants, which are sometimes sold in a very peaty soil preparation. This "soil" is very difficult to keep wet enough for good growth. Severe drying and loss of leaves may occur before one is aware of the soil's limitations.

Watering some man-made "soils" may be required several times daily, an impractical task. Early on, then, plants should be examined and repotted, if necessary, to more water-retentive soil. I prefer to use real soil, well mixed with leafmold or humus.

Impatiens needs constant moisture as well as shade. Thorough soaking revives wilting plants quickly, but it is better to relocate them to more shade; to mulch

*Campanula isophylla*, the star-of-Bethlehem or Italian bellflower, flourishes in the cool summers of northern New England.

George Taloumis

soil against evaporation; to place pots within larger ones to slow excessive drying—all efforts well spent for the charm of impatiens' bright flowers.

In the Northeast, wax begonias, beloved for their constant bloom and tolerance of neglect, look more healthy in part shade but continue to perform prettily in full sun, if tended. Removing seed pods and pruning lanky stems brings more flowering.

Nasturtiums in pots and in hanging containers are old favorites. Pink and white ivy geraniums vie for top honors with garden geraniums, as well as collections of scented- and variegated-leaved geraniums. Strawberry jars make handsome homes for them, and for hens-and-chicks (sempervivums) and trailing sedums. Sweet-alyssum offers fragrance in white and lavender blooms. It is useful in mixed plantings or in small containers, hanging or stationary.

In upper Vermont, New Hampshire and Maine, two flowering vines thrive in the cool moist air: star-of-Bethlehem (*Campanula isophylla*) and black-eyed-Susan vine (*Thunbergia alata*), well clothed with, respectively, blue or white, and orange flowers.

In late summer and through autumn, low-growing chrysanthemums, easily transplanted from nursery bed to flower pots, furnish glorious colors (all but blue).

Trailing lantana and morning-glories provide ample bloom in raised or ground containers all summer. They ask little but water and a bit of fertilizer. Green- and white-leaved vinca vines contribute graceful variety, especially in window boxes and raised planters.

Foliage plants are always welcome. They are pleasant set in groups or in mixed plantings, as with several herbs together. Coleus, tolerant of neglect, offers a variety of leaf shapes and colors.

A diverse assembly of homey kitchen-window plants, dear to most of us, consists of English ivy in its varied forms, grape, German and Swedish "ivies," spider-plant, all the inch-plants (tradescantia and close relations) and foliage begonias. Each one is a good container subject in a protected spot outdoors, although we may think of them mainly as house plants. Again, faithful attention to water and fertilizer is the rule and, as growth overwhelms the planter, pruning for appearance and renewed vigor becomes important.

# Meet Malcolm

Container gardening on a small budget? Need bloom quickly from seed? Several low-growing annuals, including sweet-alyssum and portulaca, rise to the occasion in five weeks if sown directly in the container and thinned. So does *Centaurea* 'Jubilee Gem', a compact (15 in.) blue-flowered bachelor's-button. All need a good degree of light but are otherwise of easiest culture.

For a change, grow the little-known Virginia-stock (*Malcolmia maritima*). This tidy annual is from the shores of southern Europe, not from Virginia, and does not resemble stock (*Matthiola*), though it is a member of the same Crucifer Family.

Rock gardeners are fond of *Malcolmia* because the flowers, with four dainty, slightly notched petals, look like arabis. They may be lilac, pink or white depending on the luck of the draw. Height: six inches. Flowering time: five to six weeks from seed, and lasting a month or longer if weather is cool. Culture: average garden soil, sun, moderate dryness.

*Malcolmia,* whose name honors William Malcolm, an 18th-century London nurseryman, is fine for use as an accent. Try a small container by the back door. Seed can be started almost anytime from early spring to September. For autumn flowering in the North, sow seed by August 1. Plants can tolerate several hard frosts and may last into November. Sources for Virginia-stock: Stokes Seed Co., 737 Main St., Box 548, Buffalo, NY 14240; Thompson & Morgan, Box 100, Farmingdale, NJ 07727.

*Extra care but extra rewards. . .*

# WINDOW BOX THOUGHTS FROM OHIO

Irma Bartell

For those without a plot of ground, container gardens answer a need to feel the soil. They also are a grower's expression of complete affection for plants, because faithful attention is necessary for lush results.

What to plant depends on where you live, what you like and where the container is located. Several casters attached to the bottom of a tub make the planting portable, so the site factor can be simplified. There is some leeway also in the case of hanging baskets.

Window boxes, on the other hand, must stay put during the growing season. The gardener who plants them must be satisfied with a fairly limited stretch of the imagination, especially in the Midwest, where weather extremes are the norm, and where it is foolhardy to attempt very many unknowns.

Old favorites are tried-and-true and least likely to cause frustration or disappointment. Think in terms of begonia, impatiens, coleus, caladium, browallia, pansy, fuchsia and ferns if the window-box site is predominately shady. Enjoy yourself with such standbys as petunia, geranium, lobelia, alyssum, ageratum, low-growing chrysanthemums and nasturtium if mostly sun prevails. That adds up to fourteen easy choices without a lot of searching, and if color variants are considered there are many more. Not bad for merely scratching the surface possibilities.

**Types of Window Boxes**

Wood, plastic and metal window boxes are readily available on the market. Redwood, oak, elm and cedar are good choices, based on durability, but it is still important to paint the wooden box with a preservative to extend its usefulness and resist fungi and insect attack. Make several thorough applications of copper naphthenate solution. It will not harm the plants. The compound is sold as Cuprinol and comes in green or brown or clear.

The word to describe container color is

Photos: George Taloumis

Rotating seasonal displays can be a desirable bonus if plants are double-potted with peat moss. In winter, sprays of juniper and bittersweet or other colorful evergreen-and-berry combinations can brighten up the scene until the tulips return.

subdued. It should never compete for attention with the planting. Keep this in mind also when selecting among the plastics. Also remember that plastics hold moisture longer because there is no evaporation through the sides.

Drainage holes are essential. Besides the necessity for a porous soil mix, there must be a way for excess water to get out. Roots require oxygen as well as water and nutrients to grow vigorously and support healthy plants.

### After Care

Plants in window boxes are prima donnas, so care for them properly. Of particular concern is adequate moisture, since the small amount of soil in a window box, compared with other kinds of containers, dries out very quickly. In midsummer, it may be necessary to water twice a day. The only way to know is the reliable finger-in-the-soil test.

Choose a lightweight mix. Brand names are based on excellent variations of the well-known "soil-less" Cornell mix. Basically, these are combinations of ground-up peat, vermiculite and perlite, with enough nutrient additive to carry plants through the first three or four weeks.

Because of frequent watering and resultant leaching of nutrients from the growing medium, fertilizer must be replenished regularly. The need is small but continuous. An easy route to follow is using one of the time-release fertilizers, following manufacturer's suggested rate of application. Otherwise, a simple rule of thumb is to fertilize once a week with one of the water-soluble houseplant formulas used at half strength.

Good grooming is the follow-through. Keeping faded flowers plucked and straggly shoots shortened is the "loving" in tender loving care.

# IDEAS FROM MICHIGAN FOR HANGING BASKETS

Alice Wessels Burlingame

The Michigan experience with container gardening is much the same as in other parts of the Midwest. In the seven warmer months the weather invites outdoor participation and, for the remainder of the year, we are content to plan for indoor accents with containers.

Old attics provide treasure for the imaginative gardener. Out of them can come pickle crocks of another era, kettles, bushel baskets and almost-forgotten planter boxes. The commercial market offers many choices, too, including the new half-baskets. There are also durable redwood barriers, which can be established as dividers on lawn or patio to be adorned with hanging baskets of bright color.

### Old Favorites and New Choices

Here are some plant selections, several of them uncommon ones, to tempt the midwestern gardener who enjoys setting up hanging baskets. In a garden center seek out the cascade-type petunias, which come in a variety of colors. Three plants are ideal for a 9-inch container. For an unusual effect grow the creeping-zinnia (*Sanvitalia procumbens*), a dainty little yellow daisy with a dark center. Plants that are seldom available from retail sources but can be easily started from seed include the Egyptian star cluster (*Pentas*), which has a dwarf selection that grows only 12 inches tall from seed. It makes a distinctive plant for hanging baskets. All of the above selections grow best in full sun.

### For Shady Spots

The range of plants for baskets in the shade is limited mostly to a few common kinds which are mentioned elsewhere in this Handbook, but two indoor ferns deserve a note for warm-season use in the garden. *Lygodium palmatum,* one of the climbing ferns, grows best in acid soil and should be cut to the soil annually. The ball fern (*Davallia bullata* of the trade) makes an excellent accent. Be sure to turn the ball daily for even growth.

The new half-baskets are ideal for walls and fences where installing a conventional round hanging basket could be a real chore.

Photos: George Taloumis

Never underestimate an old standby for adding color and texture to an entryway. Hanging geraniums in a shell-pink streaked with red give a cheery summer welcome.

Neither fern should be allowed to dry out. Both, in fact, benefit from frequent misting with a moisturizer.

Azaleas are not thought of as hanging basket plants, but one of the prostrate kinds, *Rhododendron nakaharai,* from Taiwan, is well suited. Fairly recent to cultivation in America, it has large coral-red flowers in June and July. In cool climates such as Michigan it must be brought indoors in winter. Another newcomer is the Rieger begonia, which is high on my list of favorite hanging-basket plants. Both the azalea and the begonia need ample moisture and part shade.

### Indoor Year-round Ideas

A welcome indoor addition could be hanging baskets using dried materials. (Directions for drying can be secured from the library.) For "earth" colors, try dried weeds, the dark fiddle-head of ferns, dried black-eyed Susans, woodbine or similar choices. For a bedroom or bath, baby's breath, pearly everlasting, chive blossoms, small marigolds or cotoneaster are nice. Dried zinnias, salvia, statice, daisies, carnations, ivy or marguerites, among others, could be used to brighten an office or home.

(A note about your container for dried hanging arrangements: if it doesn't seem heavy enough, line the bottom with stones, fill the container with Oasis, then cover the surface with moss before filling with your dried arrangement. You'll have both a good weight and an attractive finished look.)

*Difficult but not impossible. . .*

# CONTAINER TREES AND SHRUBS: A KANSAS EXPERIENCE

Frank Good

My home town, Wichita, Kansas, is a transition zone for plant life, being neither truly north nor south. Wintry blasts roar down the long corridor of the prairies, uncontested in their fury, frequently bringing little snow and showing little concern about the survival of plants, especially those grown in containers. A few days after a bad storm the weather may ameliorate; plants must then cope with a warm spell. All the while the seasonal dryness hammers at plant vitality.

In this region trees, shrubs and other plants which have survived over the millenia have been those able to put roots deeply into the soil, escaping the ravages of winter. Today, in container gardening, the same principle applies: the woody plants which thrive in containers are those whose roots are not excessively exposed to widely fluctuating temperatures. (Would that they had the tenacity and tolerance of *Sedum acre* or *S. obtusifolium!*) Only minimal success has been obtained with native red-cedar (*Juniperus virginiana*) and other trees and shrubs in containers which have bottoms. This limits their use to ground-level container landscaping.

Bottomless containers give the visual effect desired and permit woody-plant roots to roam deeply into frost-free soil. Also, one is assured of having adequate drainage, which is a perennial problem with free-standing containers with bottoms. Considerable success has been obtained in planting beds with raised edges that give the general appearance of containers but which have all the advantages of free soil.

### Problems with Water

Along with the hardiness problem, container growers must cope with the region's general alkalinity. Municipal water in Wichita is quite alkaline with the pH ranging from 8.3 to 8.5. In containers with bottoms there is a continuous undesirable buildup of alkaline salts as municipal water is employed, and eventually plants succumb unless an acidifier is used regularly.

Winters in this area are relatively dry. Natural precipitation cannot be counted on to supply container soil needs. Container plants have been lost because own-

Low-growing ornamental grasses, here mixed with dusty-green herbs and a dwarf juniper, are a hardy alternative where intense summer heat makes growing flowers in containers a problem.

M. Joyner

Goldenrain trees (*Koelreuteria paniculata*) are admirable subjects for containers. In addition to their "showers" of yellow flowers in early summer, the panicles produce cascades of seedpods later in the season.

ers have failed to appreciate the need for supplemental watering during dormancy. It is always helpful to use mulches during the dormancy period. Not only is soil moisture saved but also the mulch keeps the soil cool so plants will not make false growing starts if erratic weather occurs.

### Grasses—A Surprising Choice

Among the plants able to bridge these problems are the sometimes unappreciated ornamental grasses: Fountain grass (*Miscanthus sinensis* 'Gracillimus'); Ravenna grass (*Erianthus ravennae*), which resembles Pampas grass but is hardier; and blue fescue (*Festuca ovina glauca*), a low-growing clump-former. Other plants of a similar nature include big blue lily-turf (*Liriope muscari*), giant reed (*Arundo donax*), Adam's-needle (*Yucca filamentosa*) and curveleaf yucca (*Y. recurvifolia*).

The ownership factor makes a difference in the survival rate of container plants. Plantings that ordinarily would be bad survival risks thrive because the owners care enough to give them personal attention, mulching them carefully in winter or moving them to protected sites.

Containers used to decorate business areas may be satisfactory if a good maintenance program is followed, but it's a trade-off—dollars for maintenance. Some of those dollars need to be allocated to replacement of plants every two or three years, regardless of the care they receive. Though losses may be high, the visual appeal of live plants makes the cost seem worth the high upkeep.

With all these gloomy factors presented, perhaps one is disinclined to try container gardening in this region. Far from it! There are many kinds of plants adaptable to a greater or lesser degree. This presents a well nigh irresistible challenge, one the avid enthusiast can hardly ignore. A list of suitable container subjects for Kansas and similar areas follows.

#### Shade Trees

Green ash, Seedless (*Fraxinus pennsylvanica* 'Marshall's Seedless')
Cottonwood, Cottonless (*Populus deltoides*, non-fruiting form)
Elm, Chinese (*Ulmus parvifolia*)
Elm, Siberian (*U. pumila*)
Honey locusts, Thornless (*Gleditsia triacanthos* selections, esp. 'Shademaster', 'Skyline', 'Sunburst')
Oak, Bur (*Quercus macrocarpa*)
Oak, Pin (*Q. palustris*)
Pagoda- or Scholar-tree (*Sophora japonica*)

Plane-tree, London (*Platanus* x *acerifolia*)
Sweetgum, American (*Liquidambar styraciflua*)
Zelkova, Japanese (*Zelkova serrata*)

**Ornamental Trees**

Crab apples, Flowering (*Malus* cultivars)
Goldenrain-tree (*Koelreuteria paniculata*)
Hawthorn, Washington (*Crataegus phaenopyrum*)
Maple, Amur (*Acer ginnala*)
Pear, Bradford (*Pyrus calleryana* 'Bradford')
Pistache, Chinese (*Pistacia chinensis*)
Plum, Purple-leaf (*Prunus cerasifera* 'Atropurpurea')
Redbud, Eastern (*Cercis canadensis*)
Russian-olive (*Elaeagnus angustifolia*)

**Evergreen Trees**

Juniper, Eastern Red-cedar (*Juniperus virginiana*, many cvs.)
Juniper, Rocky Mountain (*J. scopulorum*, many cvs.)
Pine, Austrian (*Pinus nigra*)
Pine, Scots (*P. sylvestris*)
Pine, Ponderosa (*P. ponderosa*)

**Broad-Leaved Evergreens (or nearly evergreen)**

Cotoneaster, Spreading (*Cotoneaster divaricatus*)
Euonymus, Spreading (*Euonymus kiautschovica* cvs.)
Firethorn, Scarlet (*Pyracantha coccinea* cvs.)

**Deciduous Shrubs**

Barberry, Mentor (*Berberis* x *mentorensis*)
Coralberry, Indian-currant (*Symphoricarpos orbiculatus*)
Dogwood, Red-osier (*Cornus sericea*)
Euonymus, Compact winged (*Euonymus alata* 'Compacta')
Forsythia (*Forsythia* x *intermedia* cvs.)
Honeysuckle (*Lonicera* spp. and cvs.)
Lilac, Chinese (*Syringa* x *chinensis*)
Lilac, Common (*S. vulgaris* cvs.)
Mock-orange (*Philadelphus coronarius*)
Privet, Amur (*Ligustrum amurense*)
Quince, Japanese (*Chaenomeles japonica*)
Spirea, Vanhoutte (*Spiraea* x *vanhouttei*)
Sumac, Fragrant (*Rhus aromatica*)

**Ground Covers**

Euonymus, Purple-leaf Wintercreeper (*Euonymus fortunei* 'Coloratus')
Honeysuckle, Hall's Japanese (*Lonicera japonica halliana*)
Ivy, English (*Hedera helix*) (shade only)
Juniper, Andorra (*Juniperus horizontalis* 'Plumosa')
Juniper, Japanese Garden (*J. procumbens*)
Juniper, Pfitzer (*J. chinensis* 'Pfitzeriana')
Juniper, Sargent (*J. chinensis sargentii*)
Juniper, Tam or Savin (*J. sabina tamariscifolia*)
Spurge, Japanese (*Pachysandra terminalis*)
Stonecrop, Goldmoss (*Sedum acre*)

# The Season Doesn't End on Labor Day

One of the benefits of container gardening is that the evidence can be destroyed if something goes wrong, and no one need ever know. Another is the alternating display of short-season plants, which are removed when bloom is done. Pansies are a pretty rite of spring and in cooler areas look well most of the summer if seed pods are promptly picked—and plants fertilized occasionally. Often, however, they become worse for wear in hot weather. English daisies also tire early, as do annual phlox and pinks.

Part of the joy of gardening is to always have something to look forward to. If there is a sunny out-of-the-way spot, perhaps behind the garage or on the side of the house, why not set up a table and grow a few plants that are at their best in late summer or autumn?

Separate containers might be devoted to compact chrysanthemums, low-growing asters, showy stonecrop (*Sedum spectabile*), curved gray-leaf allium (*A. senescens glaucum*) and ornamental kale. When they come into their own, move them to the patio. In parts of the country where winter is not too harsh, the kale may be attractive far into the cold months. The other plants, which are perennial, can be removed from their containers and set in the ground after bloom, then mulched well when freezing weather comes. If a small cold frame is available for over-wintering, the possibilities are almost limitless.

# CONTAINER PLANTS FOR FLORIDA

Gil Whitton

A large number of plants grown in Florida are suitable for containers. Those selected and grown are limited only by the individual's choice and the area where they will be displayed. Residences with pools and patios can use much larger-growing plant material than apartments, condominiums and mobile homes. There is a plant to fit any location where a container is appropriate. Listed here are some of those most frequently used. Many are grown only for foliage, others for foliage and flowers.

BIRD-OF-PARADISE (*Strelitzia reginae*) is one of the most exotic flowering plants grown in a container. It is an herbaceous perennial with large banana-like leaves. The plant produces no true trunk. Flowers are produced on strong stems and are orange, blue and white. Each flower resembles a bird in flight. Scale insects and potassium deficiency are two common problems.

SWORD-FERN (*Nephrolepis cordifolia*) comes in an amazing variety of sizes, shapes and textures. The fronds may be extremely large (up to five feet) or very small. It is the easiest of ferns to grow and can tolerate temperatures as low as 32°F.

CORAL ARDISIA (*Ardisia crenata*) is a small plant that produces attractive white or red fruit. The waxy green leaves are borne near the growing tip of the plant. It must be grown in part shade. There are no important diseases.

CROTON (*Codiaeum variegatum*) provides masses of color with red, yellow, green and cream-colored leaves. It is sensitive to cold but tolerates 32° F. Plants grow well in full sun or part shade. Crotons are very susceptible to mites, lacewing and scale insects. New plants start easily by air-layering.

CUBAN-BUTTERCUP, WEST INDIAN-HOLLY (*Turnera ulmifolia*) is a rugged small plant used to brighten patios. It may appear a bit weedy, but pinching makes it acceptable. Foliage is dark green and glossy, but hairy beneath. Brilliant yellow flowers decorate terminal shoots. It is very salt tolerant.

DRACAENA (*Dracaena marginata* of the trade) can be used inside or outside. It is one of the most popular kinds. The trunks are leafless except at the terminal point. Leaves are a medium green color with a red margin. The plant can easily be over-watered, so grow on the dry side.

FALSE-ARALIA (*Dizygotheca kerchoveana*) is a delicate-foliaged plant, especially attractive in urns. The foliage is mottled, reddish-brown, prominently notched and palmate. Juvenile foliage is different from that of mature leaves, which are much broader. Both kinds grow on the plant at the same time. False-aralia

Cuban-buttercup (see above).

*Gil Whitton*

George Taloumis

Unusual container heightens the interest of a large, shrubby palm. Note Chinese hibiscus in background.

is very susceptible to scale insects. Growth is best in part shade.

FOXTAIL-FERN (*Asparagus densiflorus* 'Myers') is used for its unusual shape of growth. The stems are stiff with foliage completely around them like a bushy fox's tail. Leaves are medium to dark green. Extra nitrogen is needed to keep the foliage green. Use in urns or hanging baskets.

HIBISCUS (*Hibiscus rosa-sinensis*) is a robust plant that is available in many varieties, including one with variegated foliage. Hibiscus is grown mainly for the many colored flowers. This plant is very adaptable to container growing.

KAFFIR-LILY (*Clivia caulescens*) is a herbaceous perennial with dark green, strap-like leaves. The plant grows from fleshy roots with a bulb-like structure at the base of the leaves. The salmon-tipped scarlet flowers shot with green are borne in a terminal umbel. It does best in shade.

SAGO-PALM, KING SAGO (*Cycas revoluta*) gives an elegant air to any area. Dark green, waxy leaflets make the plant resemble an exotic fern. Leaflets have a sharp point. It is a very slow grower. Extra manganese will be needed to pre-

vent frizzled leaf growth. This cycad is also susceptible to scale.

LADY PALM (*Rhapis excelsa*) is a multiple-trunk palm ideal in deep shade. The foliage is very stiff, coarse and dark green. Plants are slow growing. The trunks are not smooth but covered with the remains of fronds. Lady palm blooms but does not set seed.

PIGMY DATE PALM (*Phoenix roebelenii*) is one of the finest palms for containers. The fronds are small with very fine leaflets. It is extremely slow growing and can live in the same container for many years. There are few problems.

SPLIT-LEAF PHILODENDRON (*Philodendron selloum*) is a coarse, robust plant. The leaves are dark green, deeply lobed and borne on long petioles. Leaves may grow to three or more feet. Philodendron is satisfactory in full sun or part shade. It produces a scented, cream-colored spathe after several years.

UMBRELLA-TREE (*Schefflera actinophylla*, or now, *Brassaia actinophylla*) is a rapid grower with light green, palmately compound foliage. The leaves are shed quickly as the trunk elongates. Umbrella-tree produces spectacular red flowers that stand above the foliage. It is very susceptible to whitefly.

*Gil Whitton*

Split-leaf philodendron, umbrella-tree, false aralia and variegated succulent soften a corner of an enclosed patio.

# TOMATOES ON A NORTH CAROLINA BALCONY

## Pointers for growers almost anywhere

Cora A. Harris

In Charlotte, North Carolina, where I live, an increasing number of apartments and condominiums with balconies are being built. The balconies receive varying degrees of sun and shade depending on their exposure, and experienced container gardeners choose their plants according to how much light they will get. Tomatoes are tops in popularity with growers who can provide a good amount of sun.

The erratic southern spring, where days and nights can be extremely cold or warm-to-hot and combined with a few windy upsets, doesn't dim the enthusiasm of apartment dwellers. They stand in line at shopping centers in April and May to buy ready-to-plant tomatoes in peat pots along with bags of porous and fast-draining soil, large clay pots and specially formulated fertilizer.

Bewildered new container gardeners are given helpful information by clerks who warn that tomato plants need full sun, deep planting and more attention to moisture than those in conventional gardens. There are different kinds of tomato plants for different purposes, and the clerks may suggest ones bred specifically for containers or, at least, self-branching kinds that stop growth when a certain height is attained. Also, the gardener has a choice of cherry-type, medium-sized and large-fruited tomatoes. As a novelty there is even a square type, which is grown mostly for paste. Regardless of variety, three or four plants per person are average.

### Care

Tomato plants, on North Carolina bal-

New plant varieties make container vegetable gardening easier than ever before. Clockwise from top left: 'Early Girl' and 'Better Boy' tomatoes, 'Patio-Pik' cukes, 'Patio' tomato, 'Yellow Belle' pepper and 'Royal Knight' and 'Mission Bell' eggplants.

George J. Ball, Inc.

Petroseed

'Patio', one of the two tomato varieties that the author grew on her balcony, is bred to produce compact foliage and heavy fruit.

conies or elsewhere, have enormous water requirements. A thorough watering when soil is dry to one inch, as well as frequent misting, is essential in hot, dry weather. Large-sized containers, with the soil surface covered with an inch or more of mulch, help preserve moisture, but expect to water often. Regular watering is also important for minimizing blossom-end rot, which may occur if the soil is allowed to dry out.

Apart from watering, the care of tomatoes is fairly simple. A good initial soil-mix, with a handful or two of superphosphate worked in if phosphorus is deficient, contributes to proper growth and fruiting. Monthly feeding with a commercial fertilizer such as 5-10-10 or a special tomato fertilizer is a routine procedure because tomatoes have strong nutritional needs. However, avoid high-nitrogen fertilizers, which bring lush greenery at the cost of fruit.

Larger-growing tomato varieties will need staking and tying, smaller ones may not. During the growing season remove suckers that form between the branches and main stem. The only insect pest on my own tomato plants is the whitefly, which is easily subdued by applying blobs of soapsuds underneath the leaves.

**Personal Experience**

Tomato performance varies from year to year and even within the same season, depending on weather and care. My own experience last year may be of interest. Two window walls in my small apartment with a balcony measuring 6 ft. x 25 ft., enabled me to keep an eye on six 'Patio' and two 'Better Boy' tomato plants. Five in my collection were planted in late May and three were added July 1.

All produced well, and I picked tomatoes daily until a drought and 95° high temperatures occurred for weeks at a time. Although tomatoes thrive in heat, there are limits, and in August I had only three plants left despite close attention to watering and misting. By that time there were few tomatoes left in the stores, an indication that even commercial growers had experienced difficulties. Still, I had the pleasure of a balcony crop and look forward to another season with renewed enthusiasm.

*Heat and drought are problems in. . .*

# CONTAINER GARDENING IN THE DEEP SOUTH

Frank A.C. McCulla

Because the climate is semi-tropical (Zone 9) container gardening is not done extensively in our part of the country. The long, hot summers and short, almost balmy winters make gardening in the ground possible all year-round.

Container gardening in the Houston area, where I live, requires constant attention to watering which must be done twice a day in extreme heat. Last year, for example, there were 15 days of temperature readings of 100° or more, and many plants in containers simply baked. Container gardening, therefore, is used to meet special needs where in-ground gardening isn't practical or possible.

Large containers do not dry out as quickly as small ones, so it is no surprise that they are more commonly employed on patios and in other areas of outdoor gardens. The plants used in them are heat-resistant sorts chosen for bold, durable foliage and flowers. Among the most common are cannas, gingers, dwarf dahlias, hibiscus, dwarf bananas, oleanders, gardenias, hollies and gold-dust aucuba. The attractive miniature pomegranates and dwarf crape-myrtles are also used; each year new dwarf varieties of shrubs and trees offer more for the container gardener.

Of course, annuals and perennials are used in containers. We start off with petunias in large pots. When they pass out from extreme heat, we replace them with annual vincas which last all summer and reseed themselves.

Recently, vegetable growing in containers has been most popular. My own garden usually has some 15 to 20 containers of sweet peppers, small cucumbers and a variety of small tomatoes. One tomato variety, 'Patio', does very well. The large types of tomatoes will not set fruit

George Taloumis

Oleander, the official ornamental shrub of Galveston, is given top marks by the author for container culture in the Deep South.

Southern Nurserymen's Association

In a home eminently suited for plants, the alternative to outdoor growing in intense heat was to invite the patio into the living room.

when temperature is high, but the cherry and various other small ones will bear until frost cuts them down. Hanging baskets, though they require extra watering, are also popular. Regardless of the kind of container, if plants are to be grown in them year-round, they usually require protection should winter be prolonged.

Ending the gardening year, large pots of hyacinths and tulips, which have been precooled for four to six weeks, are planted between Christmas and New Year, weather permitting.

### Oleander—Nearly Ideal

Among year-round plants, oleander (*Nerium oleander*) is one of the best for containers. Gardeners here use it in tubs on patios or sun porches, by pools and, of course, planted among other shrubs in the garden. Plants tolerate heat and drought very well, and the dark evergreen or variegated foliage is attractive in all seasons. Full sun is required, but oleander is not affected by drying winds, smoke, soot or salt spray. An average good potting soil is all that is necessary. If unusual cold threatens on a winter evening, plants benefit from protection.

Oleander blooms in early spring, and plants at this time should be kept moist. There are many named varieties, including dwarfs, in a range of flower colors: rose, red, salmon, pink, white, yellow and various combinations. After bloom, prune oleander lightly to keep uniform, otherwise it may become loose and leggy. An application of cow or sheep manure, watered in before new growth starts in spring, makes plants respond with vigor.

Oleander is sometimes attacked by mealy bugs and aphids, both of which can be checked by a strong spray of water. Scale insects may also be a problem; control with Sevin. Note: Children should be warned not to chew on the foliage, which contains a dangerously poisonous juice. Even so, this plant of Mediterranean origin is highly regarded by Texans, and Galveston itself is known as "The Oleander City," with more than a million shrubs grown on the island.

*Hanging baskets provide. . .*

# BEAUTY ON HIGH— IN CALIFORNIA

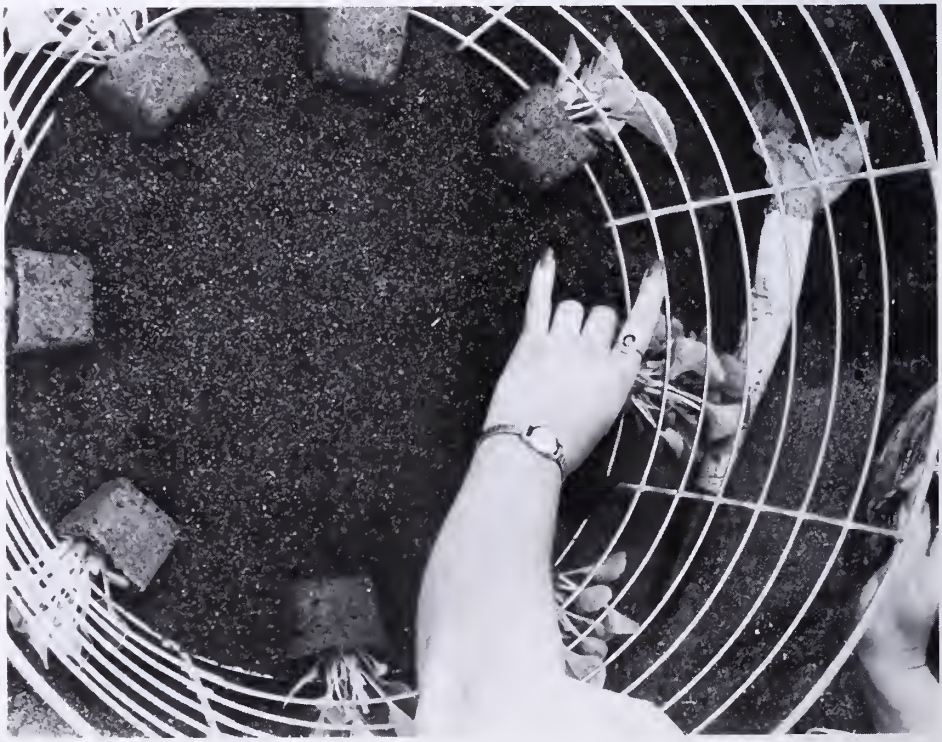
Richard L. Tracy

It's practically impossible to pinpoint one particular type of flower as the most popular container plant in California. That is because of the geography of this giant stringbean-shaped slice of real estate bounded by the Pacific Ocean on one side and the Sierra Nevada Mountains on the other.

Flowers that thrive in Los Angeles collapse in the relative chill of San Francisco; coastal favorites such as fuchsias and tuberous begonias burn up in the great Central Valley, and valley-floor standouts perish in the winter chill of the mountains and foothills.

No matter what the climate dictates in each of the various areas, however, each has its colorful performers ready to put on a show in hanging baskets. And, as visitors to Victoria, British Columbia, and Tivoli Gardens in Copenhagen will testify, there are few sights as brilliant and colorful as a flamboyant display of eye-level floral color.

One of our local growers, Delia Ruiz of Capital Nursery in Sacramento, has had much experience with hanging baskets and suggests some old standbys—wax begonias, impatiens, coleus and petunias. She adds that snapdragons, vinca and



*All photos: Richard L. Tracy*

How to plant a large basket: start with a layer of moistened sphagnum in the bottom of the wire basket; add a layer of potting mix and place transplants (in this instance wax begonias were used) through the sides of mesh; repeat, alternating plants back and forth so they have space to grow and cover basket; sphagnum or sphagnum and vermiculite should be used in center. Next page: top—wax begonias are planted on top of basket; bottom—the completed basket several weeks later (see also page 21).

Sweet William also make ideal subjects.

Wire baskets and accessories needed for the project are available at most major nurseries and garden centers. The baskets come in conical, hemispherical and wall-pocket shapes. A 16-inch wire basket usually sells for less than $3.

It is important to remember that the baskets must never be allowed to completely dry out, as it is very difficult to get them thoroughly moistened again without completely submerging the entire basket in water.

Another point, especially with plants like coleus and impatiens, is that gardeners should pinch them back to achieve a bushy effect. Watering and fertilizing are no problem, except one should let the hose trickle at *very low* pressure and wait until water drips from the bottom of the basket. That's the signal it is wet all the way through.

Start the project by placing an inch-thick layer of moistened sphagnum moss at the bottom of the basket, followed by a layer of potting mix about one inch deep. On top goes the first level of wax begonias, which are covered with moistened sphagnum tucked firmly in place to prevent air pockets around the emerging roots.

Next comes another layer of soil to build up the outer edge of the basket to the next level in the mesh cage. Plants are staggered back and forth from one side

of the rectangular openings to the other, so they have room to fill out as they mature—and completely cover the wire basket with flowers and foliage.

While providing enough soil on the perimeter of the basket, the center should be filled with a light substance such as perlite, vermiculite or sphagnum. Using potting mix in the center creates too much weight and may cause the basket to slip off its chain hooks toward one side or the other, spilling onto the floor.

For those who fancy fruit plus flowers, strawberries lend themselves well to basket planting—providing a treat for the palate as well as the eye.

# AN INVITATION TO JOIN AND ENJOY

**A man does not plant a tree for himself;**
**he plants it for posterity.**
**—Alexander Smith**

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.....cut off here .....

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BROOKLYN BOTANIC GARDEN RECORD

# GROUND COVERS and VINES

- Best Ornamental Ground Covers and Vines
- Their Place in Good Landscape Design
- Care and Cultivation • Regional Reports
- Uses in Special Situations

PLANTS & GARDENS

Vol. 34 - No. 2
(Summer, 1978)

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BROOKLYN BOTANIC GARDEN RECORD

PLANTS & GARDENS

# GROUND COVERS AND VINES

Vol. 34 Summer (August) 1978 No. 2

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Roche

Roses come with many growth habits. Some of them are capable of being either vines or ground covers. 'Silvermoon', a hybrid climber, is shown here.

## LETTER FROM THE BROOKLYN BOTANIC GARDEN

Over the years BBG has taken a close look in print at various plant subjects, and some sixty Handbooks on different themes have appeared. One of the gaps in the series has been on ground covers, and in view of the trend toward smaller, low-maintenance gardens, a mini-manual on "living carpets" is long overdue. We are indebted to Mr. Gary Koller of the Arnold Arboretum of Harvard University for serving as guest editor of this section of the Handbook.

Vines, some of which are indeed ground covers in their own right, are discussed in another section of this Handbook. Interest in them seems to be again on the rise for a number are ideal city plants. They soften the harsh concrete corners and often just poor architecture of older buildings in a way no other kind of plant can. Many of them are rough-and-tumble growers, able to thrive under difficult growing conditions and to give beauty at little cost in money or space. We are fortunate in having a lifelong student of vines, Dr. Donald Wyman, esteemed Horticulturist Emeritus of the Arnold Arboretum, serve as guest editor of the vine section of this Handbook. In this effort he brings up to date the information on vines presented in an earlier BBG guide.

Both ground covers and vines, if properly chosen and given a modicum of care, rank with mulches as the greatest labor-savers in the contemporary garden. Before making any selections of them, however, it is wise to carefully study the attributes and limitations of particular ones. Some are rambunctious, frolicsome growers, satisfactory for only large, informal areas; others are refined, slow growers that are in place only in small gardens. It is said elsewhere in this Handbook, but the point is worth underlining—when possible, visit a nearby botanic garden or arboretum and see how the plants behave in action.

Many thanks to guest editors Koller and Wyman, and their contributors, for making this new Handbook possible. In the course of your own garden planning this year or next, include some ground covers and vines and you will be astonished how they can bring a still picture to life. No garden is complete without them.

Sincerely,

Frederick McGourty, Jr.

Editor

*Design considerations before planting . . .*

# GROUND COVERS IN THE LANDSCAPE

William H. Frederick, Jr.

Ground covers are part of virtually every satisfying garden picture. Because there is a great variety from which to choose, they provide the potential for horticultural enrichment. Even more importantly, however, they contribute significantly to the structure and overall aesthetic strength of our gardens.

### Unification

Ground covers unify the many diverse elements that occur in a single garden scheme. For instance, our exuberant tendency to grow many varieties of plants might lead us to place together in a sunny location shrubs of such varying forms as forsythia, firethorn and butterfly-bush. Tying them together with a ground cover of rock-spray cotoneaster (*C. horizontalis*) would create unity out of diversity. As another example, a grove of tulip-trees, dogwood and spice-bush, growing in a semi-shaded area, would be greatly enhanced by a ground cover of pachysandra.

### Tie to the Earth

The presence of ground covers brings tree and shrub groupings into repose with the earth on which they grow. Taller covers provide the transition from trees and shrubs to lower covers and these in turn to an open-space "carpet."

In a wooded area a mass planting of cinnamon fern may provide transition from tree and shrub groupings to a carefully preserved moss patch. The moss in turn may provide the transition from the ferns to the smooth, mirror-like surface of a pond.

The same technique can apply to a sunny garden if, say, a large group of the vigorous yellow-flowered Hyperion day-lily is planted between trees and shrubs. In front, a lower, even more extensive planting might consist of *Sedum kamtschaticum*, which has yellow-green foliage. It in turn might be used to provide transition from the day-lilies to a stone-surfaced terrace.

### Dramatization of Land Contours

Any single ground cover planting is of uniform height when grown in the same exposure, and this can be a means of emphasizing land contours. If the land is level the cover will have the tranquil quality of a lake surface, an example of which is the traditional "green" on a golf course. If the land has pleasant undulations these will be dramatized by the ground cover. We see this successfully carried out in contemporary mound plantings where tight-growing covers such as *Juniperus horizontalis* 'Wiltonii' have been used.

### Definition of Open Spaces

Finally, and most significantly, ground covers define shapes of open areas in our gardens. Open areas may be used for, among other things, eating, sitting or playing games. Without open spaces our gardens would be functionally useless. In addition, gardens would be dull if solidly planted, without the visual relief of occasional open spaces.

If these spaces have a strong and pleasing shape that is clearly defined, the garden is rewarding to see at all seasons of the year. It is the quality of this "leftover space" that really counts. In designing gardens this is where we should start, rather than with flower borders, screens and groups of shrubs. If the shape of the space is not satisfying, the most attractively arranged planting of trees and shrubs may fail. The shape may be curvilinear or rectilinear. In contemporary gardens this shape is often as carefully studied and proportioned as a Mondrian painting or a Matisse "cut-out" and gives

George Taloumis

Three varieties of hosta and a dwarf yew give texture and color interest to a low border. These plants are also shade tolerant.

the viewer equal satisfaction.

Ground covers give crisp, permanent definition to these forms. It is usually appropriate to use only one ground cover in an area, and to use it in great quantity. This is, of course, a blow to the gardener who enjoys collecting many varieties of plants (and there are more ground covers to choose from than there are trees and shrubs). Restraint, however, is the key to success.

Because it provides the transition from the open space to the mass of the shrub and trees groupings, the size of the ground cover planting in this context will depend on the size of these latter two elements. It is a matter of creating a total picture of pleasing proportions.

The open space itself is most often planted in lawn grass, which is indeed a ground cover, but it may also be composed of other plant materials such as moss, heather or thyme. It may be pebbles, water or a paving such as flagstone, brick or blacktop. As an example, a beautiful shady, curvilinear lawn might be defined entirely by a mass planting of *Liriope muscari* 'Big Blue'. The definition, on the other hand, might be a series of three huge drifts of ground covers of different heights such as Baltic ivy (*Hedera helix* cv.), green-white variegated *Hosta* 'Thomas Hogg' and weeping English yew (*Taxus baccata* 'Repandens').

### Scale, Texture and Color

We must always consider the scale or size of our gardens and select ground covers of appropriate size. Owners of city gardens may well want to think in terms of *Euonymus fortunei* 'Minima', thymes, Bowles periwinkle (*Vinca minor* 'Bowles'), sempervivums and blue fescue (*Festuca ovina glauca*), all of which are small growers. Suburbanites, with larger gardens, may prefer mass plantings of

bolder materials such as *Yucca glauca, Ilex crenata* 'Helleri' and *Fothergilla gardenii.*

A landscape architect thinks of ground covers (and other plants) as tools to use in reaching design objectives. In this respect, there are both texture and color with which to work.

Ground covers with broadleaf texture such as European wild ginger (*Asarum europaeum*), *Ajuga pyramidalis* 'Metallica Crispa' and mountain cranberry (*Vaccinium vitis-idaea minus*) have distinct light-reflective qualities that remind the viewer of a water surface. Those with narrowleaf texture such as lawn grass, hay-scented fern, moss phlox, armeria and paxistima absorb light. This gives the designer the opportunity tc increase light in a dull corner with broadleaf plantings and to absorb light with narrowleaf ones where the garden is bright and is used primarily in the middle of the day during the sunnier seasons of the year.

The use of color requires careful thought. The designer must consider the colors of buildings, fences and paving because they usually dominate any scene, and plants should harmonize with them.

The conscientious designer also observes the time of day and the time of year the area is most frequently used. All-year use will require either evergreen ground covers, herbaceous covers which have persistent foliage (*Geranium macrorrhizum*), or deciduous kinds with attractive branching habits (*Cotoneaster horizontalis*), twig formation (*Salix repens argentea*) and/or bark color (*Vaccinium angustifolium laevifolium*). Summer-evening use may well dictate plants with a cooling effect such as *Hosta plantaginea* with its light green foliage and "fresh white" flowers.

*Anita Sabarese*

Flowers of *Ajuga reptans* show how it obtained the name "bugle." Small but heavily textured leaves give it character when not in bloom.

*George Taloumis*

Lamb's ears *(Stachys byzantina)* with its downy grey-green fuzz contrasts handsomely with the granite-quartz boulder.

### Designing for Mood

Finally, the designer must decide what mood he is attempting to create. If the garden is to calm, soothe and bring weary minds into repose with nature, shades of green such as are found in Quaker-ladies (bluets), sweet woodruff, dwarf sarcococca and bergenia may be the key.

On the other hand, a direct assault on the tensions of today's working world may require a studied exuberance, to be provided by mass planting of ground covers with colorful foliage or flowers. There are many candidates to choose from. In a sunny situation of large scale

William H. Frederick, Jr.

A short but steep bank holds its soil and form with a planting of pachysandra. Sugar maples *(Acer saccharum)* provide the shade that the ground cover requires.

one might place a drift of fountain grass (*Pennisetum alopecuroides*) in front of a mass planting of Crimson Pygmy barberry (*Berberis thunbergii* cv.). The pink-beige floral stalks of the grass would be seen against the bronzy purple-red of the barberry foliage. If space permitted, a large foreground planting of leadwort (*Ceratostigma plumbaginoides*) with its cobalt-blue flowers would provide further enrichment.

In a smaller garden, a blue-white-yellow scheme might capitalize on interlocking sweeps of the blue-flowered *Veronica pectinata,* the chartreuse-leaved *Thymus* x *citriodorus* 'Aureus' and the diminutive grass-like foliage of *Carex morrowii* 'Variegata' with its clearly defined longitudinal green-white leaf variegation.

If you have a hankering for grays and blues, plant lamb's ears (*Stachys byzantina*) and mouse's ears (*Cerastium tomentosum*) to provide big puddles of interlocking gray foliage for the blue grassy tufts of blue fescue *(Fescuta ovina glauca),* accented by a few clumps of the slightly larger-scale blue oat *(Helictotrichon sempervirens*).

Just as much exuberance can occur in shady situations. Again, if your preference is for grays and blues, plant a few clumps of the dramatic large blue-leaf *Hosta sieboldiana* amid interlocking drifts of the Japanese painted fern (*Athyrium nipponicum* 'Pictum'), variegated goutweed (*Aegopodium podagraria* 'Variegatum') and *Pachysandra terminalis* 'Variegata'.

Chartreuse colorations are stimulating where shadows are deep. Here one can have fun with *Hosta* 'Frances Williams', *H. lancifolia* 'Kabitan' and *Liriope muscari* 'Variegata' and, if there is enough light, Buttercup or Goldheart ivies (*Hedera helix* cvs.).

Selecting the most appropriate ground covers is as exacting a challenge as planning the menu for a gourmet meal. We must be aware not only of the merits of each course (or each plant), but also sensitive to their aesthetic relationship to each other. Most importantly, we must exercise restraint and selectivity among an overwhelming array of tempting possibilities.

*For extra rewards give attention to the . . .*

# PLANTING AND CARE OF GROUND COVERS

Mervin C. Eisel

In addition to the beauty they provide, ground covers can accomplish several useful functions in the landscape. Among the most important are soil stabilization and low maintenance. Ground covers can serve as a unifying element in a landscape design. The taller kinds can be used to create masses that balance architectural features. On a slope, dense-growing ground covers will prevent erosion, a very important function.

Many gardeners have the mistaken idea that ground covers need little or no maintenance, but properly used they can reduce work in the yard. The care required is largely dependent on how well the plants are adapted to the microclimate and soil of the site. If the proper plants are not selected, no other garden area, including the flower borders, will require more maintenance to keep in presentable condition.

### Weeding and Spacing

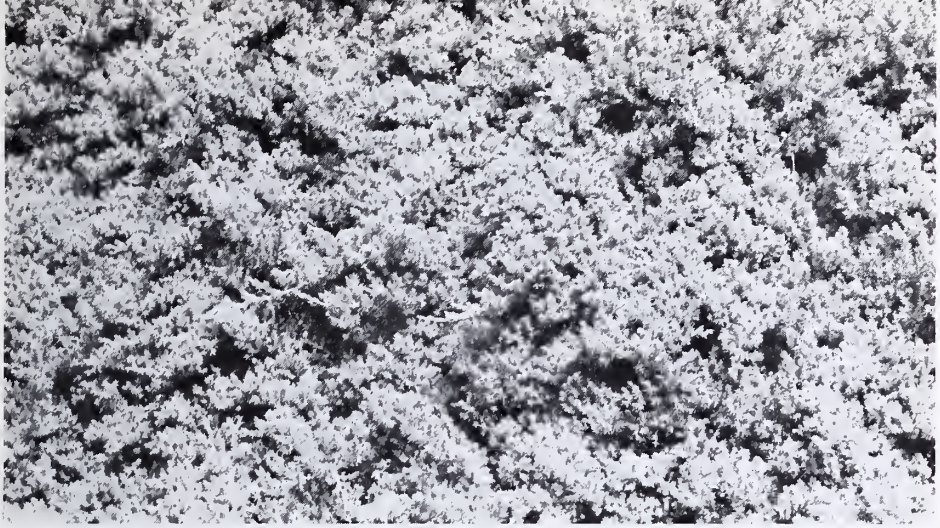
Tall perennial grasses, such as quack, brome and reed canary, are menaces in low, refined ground covers. Eradicating them and other weeds prior to planting is essential. Even then it takes constant vigilance to prevent the area from becoming invaded by weeds. Hand hoeing or pulling to remove weed seedlings is one of the most successful methods. In some cases the careful use of the proper pre-emergent herbicides can reduce the amount of hand weeding required.

Ideal ground covers are those that are dense or vigorous enough to shade out competitors. Also, a plant adapted to the site and which grows strongly is more likely to hold its own than one that is barely able to stay alive. Even with the most vigorous ground covers some nursing in the form of hand weeding, hoeing, mulching or the use of herbicides may be necessary to get them established. Herbaceous plants as well as shrubs that spread by rhizomes or roots where the stems touch the soil are often more competitive than others. Where aesthetic considerations permit, a more practical approach is to select a ground cover that outgrows its potential competition.

The initial spacing of plants has a great effect on the rate at which the ground cover fills an area and is able to hold its own. The sooner the ground is covered, the less likelihood undesirable plants will become established. A good rule of thumb for spacing is about one foot on center for vigorous herbaceous plants and 4″ to 8″ for slow-growing species.

The decision of spacing or size of plants used is often based on what a person can afford. It is often a trade-off between higher initial maintenance for wide spacing or less maintenance for close spacing. The spacing might be dependent on how large an area is to be planted. Most homeowners can afford a close spacing if only a small planting site is involved. The spacing of shrubs should be as close as two to three feet depending on the ultimate size of the shrubs, or even a one-foot spacing for dwarf shrubs.

There are few low-growing ground covers that are aggressive enough to hold their own without assistance from the gardener. Carpeting junipers are a prime example. They are attractive and hold the soil but in many plantings become badly infested with weeds unless the gardener is on watch. Japanese garden juniper (*Juniperus procumbens*) and Skandia Juniper (*Junipera sabina* 'Skandia') are two of the most competitive of the low-growing kinds. In many situations the taller spreading junipers can hold their own, provided they are resistant to juniper blight. This disease causes the foliage to become sparse, allowing weeds to come through.



Anita Sabarese

Dense, mounding texture and good winter color make *Juniperus squamata* 'Prostrata' an excellent dwarf ground cover.

Some broad-leaved evergreens, deciduous shrubs and vines are effective as taller ground covers. They include hedge cotoneaster (*Cotoneaster lucidus*), Emerald Mound honeysuckle (*Lonicera xylosteum nanum cv),* bush-honeysuckle (*Diervilla lonicera*), gray dogwood (*Cornus racemosa*), shrubby potentilla *(Potentilla fruticosa),* American bittersweet (*Celastrus scandens*) and sumacs (*Rhus glabra, R. aromatica* and *R. trilobata*). Sumacs are good examples of ground covers that cope with competition, growing above grasses and weeds and concealing them so the area does not appear unkempt. These grasses and weeds survive and prevent soil erosion. In fact, some grasses are among the best ground covers, and may be left unmowed if the area is informal.

Many of the herbaceous ground covers that are sun tolerant are not able to hold their own against weeds. Two that can, but without refined appearance, are fleeceflower (*Polygonatum cuspidatum compactum*) and crown-vetch (*Coronilla varia*). Because of their aggressiveness they often invade other garden areas, so care should be taken to curtail their spread outside the area designated for their cultivation.

### Shade

Shade is a problem to be contended with on many sites because pests and weeds are usually different from those encountered in sunny areas. There are many shade-tolerant herbaceous plants, however, so lack of light is usually not in itself a major problem. More apt to cause difficulties is the competition from large shallow-rooted trees that take water and nutrients from the soil. For this reason, shade from architectural structures is easier to contend with than shade from trees. One solution may be to remove trees that are overcrowded or in poor condition.

Among the plants best adapted for shade are plantain-lilies (*Hosta*), lily-of-the-valley, violets, Jacob's-ladder (*Polemonium caeruleum*), Mayapple (*Podophyllum peltatum*) and goutweed (*Aegopodium podagraria*). Although they are rugged, an annual application of fertilizer in early spring is usually beneficial.

For the sake of uniformity many home owners attempt to grow the same ground cover in both sunny and shady locations. There are few plants that are adapted to such environmental extremes, so it is usually necessary to use different plants. Areas that receive partial shade might have still another kind of ground cover. In such cases when different plants are used in close proximity thought should be given to texture and color harmony.

The amount of light in winter deserves

Mervin C. Eisel

Honeysuckle 'Emerald Mound', a newer cultivar, is well suited as a ground cover because of its low, spreading habit.

consideration, too. In cooler parts of the country broad-leaved evergreen ground covers must be protected from the winter sun to prevent severe browning. Planting them only on the north side of buildings or in other shaded areas is a practical approach. On exposed sites they must have winter mulch or good snow cover, otherwise they are likely to be badly injured. Since some regions cannot depend on snow cover in the winter, other ground-cover choices, including plants that die back to the ground, or low deciduous shrubs, may be more satisfactory.

Planting on a site shaded by large trees usually results in failure unless the soil is prepared ahead of time. If this is not possible, a mulch of wood chips or other material might be a better solution than planting ground covers. (In fact, where there are many large tree roots near the surface, it might be the only solution.)

Before planting under trees, a generous layer of organic matter plus fertilizer should be deeply tilled into the soil. The tilling not only incorporates the organic matter and fertilizer, but severs some of the smaller tree roots. After the area has been planted, regular watering is usually necessary. Ideally, the site should be reworked every two or three years. While this isn't possible with perennial ground covers, at least the initial soil preparation assists in their establishment.

Salt accumulation along a roadside can be injurious to many plants. With the exception of day-lilies (*Hemerocallis*), bird's-foot trefoil (*Lotus corniculatus*) and sweet-fern (*Comptonia peregrina*), few ground covers are salt-tolerant. Ground covers such as bearberry (*Arctostaphylos uva-ursi*), sweet-fern and trailing arbutus (*Epigaea repens*) require an acid soil. Crown vetch (*Coronilla varia*) and many other legumes do better on more alkaline soil. Fortunately, most plants are adapted to a wide pH range, but it is something that should be considered before investing large sums of money or work in a ground-cover planting. The winter hardiness of plants must also be considered. Some ground covers may be tender or of borderline hardiness in your climate. They may be injured by winter and not fully recover until autumn, when the injury cycle is repeated.

At least four places come to mind where a person interested in ground covers should check for the hardiness and adaptability of different kinds of ground covers. They are your neighbors, your local nurseryman, the closest botanic garden or arboretum and your county agricultural extension agent. Most extension offices have printed horticultural information available on not just ground covers but on most areas of home garden interest. They are well worth contacting.

# Reflections of an Old Pachysandra Planter

Apart from lawn grass, probably the most common ground cover in the cooler parts of the United States is Japanese spurge (*Pachysandra terminalis*). Devoting a large area to this shade-loving evergreen can be expensive if you don't already have an existing patch, especially if you want to set plants closely for fairly quick cover. About three years are needed for pachysandra to fill in completely if planted 12 inches apart.

If you have a dense bed of pachysandra and want to give over another area to it, there are few plants simpler to propagate by division. This can be done almost any time of year, but early spring is ideal because there is an entire growing season ahead for plants to become fully established. All that is needed is a sharp spade or trowel and scissors.

Pachysandra increases by stolons, in this case horizontal stems just below ground surface that give rise to new plants at the tips. Dig up a very small area and shake the soil away, and you will be amazed at the appearance—uncut subterranean spaghetti with numerous leafy shoots attached. Each one makes a new plant if severed with a piece of stolon. An existing bed of pachysandra can supply a new planting area at least fifteen times its size.

Replanting techniques vary, although none seems to fail. One of the most successful is to make a 3″ trench and insert the divisions every few inches along it. Another is to mold a little jelly roll of stolons and plant them in individual holes. We know one gardener, a frustrated sailor, who delights in tying the stolons in loose square knots. Regardless of method, the top several inches of soil should be well prepared ahead of time, preferably by the incorporation of sand and peat moss (or leaf mold, but not compost in which there is weed seed). This provides a loose, moisture-retentive medium which will encourage the spread of new stolons. An occasional application of a weakly diluted soluble fertilizer helps speed the cover. The main need the first year is watering and mulching.

A friend who works at the landscape trade reports that he asks his clients if they would like their pachysandra plants trimmed in late spring or summer to make them more "compact." His main objective, of course, is to get cuttings, which root as easily as ivy. He plants the cuttings in flats containing a mixture of half sand and half peat moss and sets them in a shady spot, where they are watered frequently. In a few weeks nearly one hundred per cent have rooted and are ready for transplanting.

*Anita Sabarese*

*A wide variety of . . .*

# GROUND COVERS FOR MOST REGIONS

Gary L. Koller

The term ground cover can be interpreted in many ways but it usually refers to any plant which is low, dense, persistent and easy to maintain. In addition, it should be somewhat aggressive and effective in suppressing most weed growth. The best ground covers are often little more than well-utilized weeds themselves.

Since we constantly need to evaluate plants as potential ground covers, several little-known and little-used kinds have been included which display all the desirable attributes. These are marked with an asterisk (*) and are meant only for the adventuresome. The remaining plants listed are proven performers in the milder parts of Canada and most of the United States, except for the very warmest and coldest regions. Selecting plants to fit your conditions of sun or shade, wet or dry, barren or highly organic soils and temperature extremes should equip you with a perfect candidate, and one which with the least effort, should reward you with years of beauty and pleasure.

***Ajuga reptans*** CARPET BUGLE
HEIGHT: 2-4 inches (5-10 cm.)
ENVIRONMENT: light shade; tolerant of full sun if watered in dry periods.
ZONE: 4; mostly evergreen in mild climates, mostly deciduous elsewhere.
ASSETS: valued for white, blue or pink flowers in May or June; foliage which may be green, purple, variegated or crinkled depending on the cultivar selected. Excellent underplanting for shrubs.
LIMITATIONS: tends to die out in spots, requiring periodic renewal planting; unless a barrier is provided it will escape into lawn areas; variegated forms tend to lack vigor.
PROPAGATION: division.

***Alchemilla vulgaris*** * LADY'S MANTLE
HEIGHT: 12-18 inches (30-45 cm.)
ENVIRONMENT: full sun to light shade; best growth in well-drained, highly organic soils.
ZONE: 3; deciduous.
ASSETS: attractive pleated leaves capture and highlight beads of dew or rain water; arching sprays of yellow-green flowers in May, useful in flower arrangements.
LIMITATIONS: in dry soils and intense summer heat the foliage loses its attractiveness in late summer; foliage somewhat coarse and flowers floppy.
PROPAGATION: seeds; division in spring.

***Arctostaphylos uva-ursi*** BEARBERRY
HEIGHT: 4-5 inches (10-13 cm.)
ENVIRONMENT: sun to light shade; tolerant of poor, sandy soils and seashore exposure; benefits from occasional application of an acid balanced fertilizer.
ZONE: 2; evergreen.
ASSETS: valued for its evergreen foliage which turns reddish-purple in the autumn, red berries are eaten by wildlife; one of the hardiest woody ground covers.
LIMITATIONS: does not transplant well, so buy container-grown plants; it must have a very acid soil (pH 5 or lower) or it will not be dense and vigorous.
PROPAGATION: cuttings taken July-September.

***Aristolochia clematitis*** * COMMON BIRTHWORT
HEIGHT: 24-30 inches (60-75 cm.)
ENVIRONMENT: sun to light shade; adaptable to various soils.
ZONE: 4; deciduous.
ASSETS: valued for leathery, heart-shaped leaves, borne on upright stems; small yellow flowers in July-August. Excellent for difficult banks, urban areas and seashore conditions.
LIMITATIONS: rampant; next to impossible to eradicate once established.
PROPAGATION: seeds (available from J. L. Hudson, Seedsman, Box 1058, Redwood City, Ca. 94064 U.S.A.); root pieces.

***Convallaria majalis*** LILY-OF-THE-VALLEY
HEIGHT: 8 inches (20 cm.)
ENVIRONMENT: sun to dense shade; best growth occurs on soils enriched with organic matter; it is a heavy feeder and benefits from periodic applications of fertilizer.
ZONE: 2; deciduous.
ASSETS: valued for upright clusters of fragrant white or pink flowers in May; excellent for difficult shady areas; dense, persistent, dependable.
LIMITATIONS: slow to get started upon transplanting; once established it may be invasive; foliage may become yellow in late summer;

Gary L. Koller

Lily-of-the-valley and sweet woodruff are mixed for contrast of foliage and texture.

fruit, which is a deep, rich orange but is seldom formed, contains a toxic substance.
PROPAGATION: division.

***Cotoneaster apiculatus*** CRANBERRY COTONEASTER
HEIGHT: 1-2 feet (30-60 cm.)
ENVIRONMENT: full sun; well-drained soil.
ZONE: 4; deciduous.
ASSETS: valued for reddish-purple autumn foliage and abundant large red berries which remain attractive into midwinter; forms dense mounds which, when grouped, give an undulating surface effect to the mass.
LIMITATIONS: not tolerant of shade.
PROPAGATION: cuttings taken in July-August.

***C. dammeri* 'Skogholm'**
HEIGHT: 12-15 inches (30-38 cm.)
ENVIRONMENT: full sun to light shade; well-drained soil.
ZONE: 5; evergreen.
ASSETS: vigorous; forms a dense, fine-textured mat; persistent red fruits; excellent for bank plantings; tolerant of salt spray.
LIMITATIONS: thin and lacking vigor in dense shade and heavy soils.
PROPAGATION: cuttings in August-January.

***C. 'Herbstfeuer'*** FALL FIRE COTONEASTER
HEIGHT: 12-18 inches (30-46 cm.)
ENVIRONMENT: full sun to light shade; well-drained soil.
ZONE: 6; evergreen.
ASSETS: valued for evergreen foliage which turns maroon in the autumn and for clusters of scarlet berries which remain through winter; it spreads rapidly and roots wherever branches touch moist soil; adapted to large areas.
LIMITATIONS: growth tends to be thin and open, so dense plantings are needed for quick effect; texture is coarse and difficult to use effectively.
PROPAGATION: cuttings taken in August-January.

***C. horizontalis*** ROCK SPRAY COTONEASTER
HEIGHT: 2-3 feet (60-90 cm.)
ENVIRONMENT: full sun; well-drained soil.
ZONE: 5; semi-evergreen in the south; deciduous in the north.
ASSETS: a spreading plant valued for reddish-purple autumn color, a herringbone branch pattern and persistent, small red berries.
LIMITATIONS: large and wide-spreading; untidy in appearance as it gets older and requires rejuvenation pruning; susceptible to scale and red spiders. Not tolerant of shade.
PROPAGATION: cuttings in July-August.

***Epimedium sp.*** BARRENWORT, BISHOP'S-HAT
HEIGHT: 6-10 inches (15-25 cm.)
ENVIRONMENT: light to moderate shade; sun if watered during drought.
ZONE: 3; deciduous.
ASSETS: valued for delicate foliage coloration as

Gary L. Koller

Epimedium is dense and persistent and, while generally overlooked as a ground cover, performs dependably, even under maple trees.

the new leaves unfold in spring; loose sprays of white, yellow, pink or red flowers in May; several forms have bronze autumn foliage; dense, persistent, adaptable.
LIMITATIONS: there is confusion in the nomenclature of this genus, so plants are best seen in flower before purchase; persistent foliage should be pruned away before new growth begins.
PROPAGATION: division.

***Euonymus fortunei*** WINTERCREEPER
HEIGHT: 4-12 inches (10-30 cm.)
ENVIRONMENT: sun to dense shade; tolerant of poor soils.
ZONE: 4; evergreen or nearly so.
ASSETS: many selections are available with small leaves and low growth habit, as well as cultivars with green or variegated foliage and forms which turn purple in autumn; branches root wherever they touch soil; valuable because of its vigor and adaptability. Excellent on banks.
LIMITATIONS: the more vigorous forms climb up and over companion plants; very susceptible to scale insects which cause it to decline and die out; needs to be cut back frequently to maintain a neat appearance.
PROPAGATION: rooted layers; cuttings in July-August.

***Galium odoratum*** SWEET WOODRUFF
***(Asperula odorata)***
HEIGHT: 8 inches (20 cm.)
ENVIRONMENT: light to dense shade; moist, organic soil.
ZONE: 4; deciduous.
ASSETS: valued for its fine-textured, light green foliage; for clusters of small white, star-shaped flowers in May and June; persistent and dependable.
LIMITATIONS: once established it can be invasive.
PROPAGATION: division.

***Geranium dalmaticum*** *
HEIGHT: 4-6 inches (10-15 cm.)
ENVIRONMENT: sun to light shade; best growth in soils rich in organic matter.
ZONE: 4?; deciduous.
ASSETS: spreads rapidly by stolons; rose-colored flowers in early summer; autumn foliage tints of yellow to red.
LIMITATIONS: intolerant of drought; in some situations it may become invasive.
PROPAGATION: seed; division.

***Hedera helix*** ENGLISH IVY
HEIGHT: 8-10 inches (20-25 cm.) as a ground cover; it is also a climbing vine.
ENVIRONMENT: sun to dense shade; in northern areas it performs best with light shade and

Gary L. Koller

*Hemerocallis* used as a tall ground cover along a path in the Boerner Botanical Gardens, Hales Corners, Wisconsin.

shelter from sweeping winds.
ZONE: 5; evergreen.
ASSETS: dark green lustrous foliage which is attractive year round; one of nature's most adaptable plants as to soil, exposure and ease of culture.
LIMITATIONS: in northern areas select hardy cultivars adaptable to the area; some have a yellow-green color; will climb into and over neighboring trees, shrubs, fences and walkways if not restrained.
PROPAGATION: rooted layers; cuttings in July-September.

***Hemerocallis spp.*** DAY-LILY
HEIGHT: foliage varies from 6 inches to 3 feet (15-90 cm.); flowering scapes vary in height depending on cultivar selected.
ENVIRONMENT: full sun to light shade; thrive in wet and dry soils, acid or alkaline.
ZONE: 3; deciduous. Some cultivars are evergreen in South.
ASSETS: persistent, dependable and virtually indestructible; varietal selection allows various heights and continuous bloom sequence from early to late summer; excellent color forms available; new foliage appears early in spring. Various parts of the plant can be eaten.
LIMITATIONS: foliage may look poor in late summer. A thought should be given to landscape uses because *Hemerocallis* is routinely consigned to difficult sites, where it may not show up to best advantage.
PROPAGATION: division.

***Hosta spp.*** PLANTAIN-LILY
HEIGHT: 4 inches to 2 feet (10-60 cm.) depending on variety.
ENVIRONMENT: sun to moderate shade; water during drought; adaptable to a wide variety of soils.
ZONE: 3; deciduous.
ASSETS: a wide selection of cultivars allows one to select for leaf shape and texture, flower color and flowering period; foliage color varies from green to blue-green and variegated and allows design flexibility. Useful for creating bold landscape effects; persistent, dependable and adaptable.
LIMITATIONS: not tolerant of drought (the foliage wilts); slugs are fond of foliage; seedlings can become weeds; on large-leaved forms the foliage may become tattered by storms and mechanical damage; new growth is rather late in the spring; much confusion in nomenclature, so plants are best seen before purchase.
PROPAGATION: division; seeds can be used, but they will not reproduce true to type.

***Juniperus chinensis sargentii*** SARGENT JUNIPER
HEIGHT: 12 to 18 inches (30-46 cm.); spreads 6-8 feet (2-2.5 m.)
ENVIRONMENT: full sun; well-drained soil.
ZONE: 4; evergreen.
ASSETS: forms a low, dense spreading mat; adaptable to poor dry soils and the seashore; vigorous grower.
LIMITATIONS: susceptible to red spiders; not tolerant of shade.
PROPAGATION: cuttings taken November-January.

***J. conferta*** SHORE JUNIPER
HEIGHT: 12-15 inches (30-38 cm.); spreads 5-7 feet (2m.)
ENVIRONMENT: sun; well-drained soil.

George Taloumis

Hosta varieties mixed with low shrubs and herbs give color interest and a unifying texture to a border.

ZONE: 5; evergreen.
ASSETS: tolerant of exposure to spray from highway deicing salts or the seacoast; forms a dense mat; drought tolerant; selections available for increased vigor and improved winter color.
LIMITATIONS: subject to rodent damage in winter; difficult to transplant, so purchase container-grown specimens; not tolerant of shade.
PROPAGATION: cuttings taken November-January.

***J. horizontalis*** CREEPING JUNIPER
HEIGHT: 4 inches to 2 feet (10-60 cm.) depending on cultivar.
ENVIRONMENT: sun; well drained soil. (If grown in the shade these plants have thin foliage, lack vigor and have poor color.)
ZONE: 2; evergreen.
ASSETS: hardy for most northern areas; the wide range of cultivars available allow selection based on height, foliage color and texture. Some forms take on winter foliage coloration different from summer color. When well grown they form a dense, persistent carpet. Drought tolerant.
LIMITATIONS: initial purchase price expensive; difficult to transplant, so purchase container-grown stock; occasionally subject to red spiders.
PROPAGATION: cuttings taken November-January.

***Lamiastrum galeobdolon 'Variegatum'***
SILVER FROST LAMIUM
HEIGHT: 8-12 inches (20-30 cm.)
ENVIRONMENT: light shade; well-drained soil rich in organic matter.
ZONE: 4; deciduous.
ASSETS: small yellow flowers in May; the variegated foliage brightens dark shady areas; vigorous, persistent, dependable.
LIMITATIONS: intolerant of drought; invasive once established.
PROPAGATION: division in spring.

***Liriope muscari*** BIG BLUE LILY-TURF
HEIGHT: 12-18 inches (30-40 cm.)
ENVIRONMENT: sun to dense shade; in northern areas best growth occurs in sheltered positions.
ZONE: 6; evergreen.
ASSETS: various cultivars have been selected for flower color, vigor and foliage coloration. Tolerant of dense shade and drought. Foliage texture and color can be used to create landscape patterns. One of the best ground covers for mild climates. Terminal flowering spikes appear in July and August and range from blue to white to pink depending on cultivar.
LIMITATIONS: slugs are partial to foliage, which is eaten in strips; foliage may look shabby in winter; old leaves should be mowed prior to new growth in spring.
PROPAGATION: division.

***L. spicata*** CREEPING LILY-TURF
HEIGHT: 10 inches (25 cm.)
ENVIRONMENT: sun to dense shade; adaptable to a wide variety of soils.
ZONE: 6; evergreen.
ASSETS: Tolerant of drought; forms a thick, dense carpet which has the appearance of a

tall, coarse lawn grass; summer foliage color is dark green; persistent and dependable.
LIMITATIONS: in northern areas winter color may be a pale green-yellow; foliage may become damaged by winter weather but the leaves can be cut back before new growth begins; slugs are fond of leaves.
PROPAGATION: division.

***Ophiopogon japonicus*** MONDO-GRASS
HEIGHT: 6-10 inches (15-25 cm.)
ENVIRONMENT: sun to dense shade; best growth occurs in a moist soil, high in organic matter.
ZONE: 6; evergreen.
ASSETS: quickly forms a dense sod with dark green foliage which is slug resistant; drought tolerant; one of the easiest ground covers to maintain over time.
LIMITATIONS: in northern areas foliage may suffer winter damage.
PROPAGATION: division.

***Pachysandra terminalis*** JAPANESE SPURGE
HEIGHT: 6 inches (15 cm.)
ENVIRONMENT: light to dense shade; thrives in soils which range from gravelly and well-drained to those high in clay content.
ZONE: 4; evergreen.
ASSETS: one of the most successful ground covers; it forms an evenly low mat of lush, dark green foliage; a variegated form is less vigorous but useful to add variation to plantings.
LIMITATIONS: not tolerant of full sun or drought, under which conditions it lacks vigor and the foliage becomes a sickly yellow.
PROPAGATION: division; cuttings in July-August.

***Phalaris arundinacea picta*** RIBBON GRASS
HEIGHT: 2-2½ feet (60-75 cm.)
ENVIRONMENT: full sun; thrives in poor gravelly soils or moist soils.
ZONE: 3; deciduous.
ASSETS: long linear leaves with white to cream-colored stripes; excellent for dry sunny banks; spreads rapidly once established; excellent for height, textural and color contrast.
LIMITATIONS: thin and floppy in the shade; invasive, so a barrier is needed to separate it from adjoining plants; wind storms may snap the tall stems.
PROPAGATION: division.

***Pulmonaria saccharata*** BETHLEHEM-SAGE
HEIGHT: 6-18 inches (15-46 cm.)
ENVIRONMENT: light to moderate shade; prefers a moist, organic soil.
ZONE: 4; evergreen or nearly so.
ASSETS: tubular flowers early in spring with colors ranging from purplish to pink and blue depending on the cultivar; white spotted leaves give a light and cheerful aspect to shaded areas all summer.
LIMITATIONS: intolerant of drought; dense colonies need to be thinned occasionally to maintain vigor.
PROPAGATION: division; seed will give a variety of floral types.

***Sedum reflexum*** * JENNY STONECROP
HEIGHT: 8-10 inches (20-25 cm.)
ENVIRONMENT: sun; well-drained soil.
ZONE: 3; evergreen.
ASSETS: attractive blue-gray foliage; golden yellow flowers in midsummer; forms a dense,

*George Taloumis*

Shrubs and bulbs are underplanted with mondo-grass *(Ophiopogon japonicus)* for slightly coarse but pleasing evergreen texture and color. Popular in California and the South.

George Taloumis

The white-spotted leaves of Bethlehem-sage *(Pulmonaria saccharata)* will light up shaded corners much of the year.

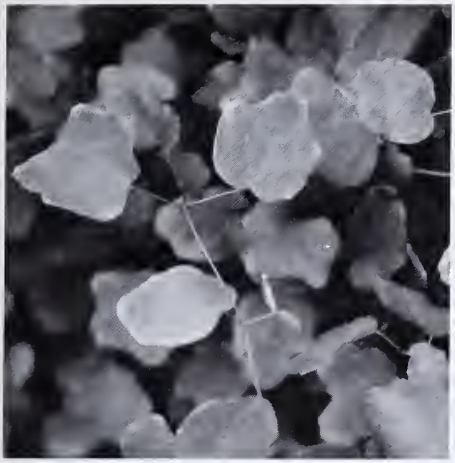
strong-growing mat; can be used to create landscape patterns; tolerant of drought.
LIMITATIONS: flower stalks should be removed as soon as blossoms fade for seed production results in a loss of vigor and thinning of the plantings.
PROPAGATION: division; unrooted stem pieces set into new locations.

***S. spurium* 'Dragon's Blood'**
TWO-ROW STONECROP
HEIGHT: 4-6 inches (10-15 cm.)
ENVIRONMENT: full sun to light shade; well-drained soil.
ZONE: 3; evergreen.
ASSETS: foliage occurs as bronze rosettes at the ends of short stems; red flowers in summer; drought tolerant; excellent for creating landscape patterns; this plant is one of the best carpet formers.
LIMITATIONS: foliage color fades and density thins out in moderate to dense shade.
PROPAGATION: division; stem cuttings in July-August.

***Vancouveria hexandra*** * AMERICAN BARRENWORT
HEIGHT: 8-18 inches (20-46 cm.)
ENVIRONMENT: light to moderate shade; best growth in a highly organic soil.
ZONE: 5; deciduous.

A handsome tall ground cover or border plant, *Sedum* 'Autumn Joy' has dusty-green leaves and muted-rose flowers that deepen with age.

M. Joyner



Gary L. Koller

*Vancouveria* forms a dense, fine-textured carpet in shade. Early summer flower sprays are white.

ASSETS: forms a dense carpet of delicate compound foliage; graceful sprays of small white flowers in early summer; once established, it is vigorous and permanent.
LIMITATIONS: slow to reestablish upon transplanting; intolerant of drought.
PROPAGATION: division.

***Vinca minor*** PERIWINKLE, MYRTLE
HEIGHT: 6 inches (15 cm.)
ENVIRONMENT: sun to moderate shade.
ZONE: 4; evergreen.
ASSETS: one of the best evergreen ground covers; adaptable to a wide range of light and soil conditions. Floral color varies from blue to purple to white, single and double, all dependent on cultivar selected; variegated foliage forms are useful in creating landscape patterns.
LIMITATIONS: slow to get established upon transplanting; in some areas subject to a stem blight which causes dieback and thinning, giving a spotty appearance and allowing the growth of weeds.
PROPAGATION: division.

# Living Mulch

Many ground covers take two or three years to carpet an area completely. In the meantime weeds creep in, smothering and sometimes killing the cover. Gardeners cope in various ways—dense planting and regular fertilizing, careful application of a pre-emergence herbicide (*e.g.*, Treflan) before planting time to prevent the germination of annual weeds, and mulching with pine needles, wood chips or similar materials. But, there is still another approach.

Realizing that something is going to grow on bare soil between the ground cover plants, why not introduce plants you like? Consider interplanting ground covers in sunny areas with compatible annuals such as marigolds, zinnias and cockscomb (*Celosia*) or a vegetable crop such as radishes, lettuce, beans or tomatoes. In light shade, coleus, flowering tobacco (*Nicotiana*), begonias or wishbone flower (*Torenia*) create color, while vegetable crops can include lettuce, parsley or Swiss chard. Direct seeding between the ground cover plants allows inexpensive planting for large areas. Any surplus which develops can be considered as weed growth and pulled out.

In watering these annuals, you will also supply water to encourage better growth of the permanent ground cover planting. Frost will remove the annual flowers and vegetables so that they will not become a weed problem in themselves.

When using annuals as a living mulch, several points must be considered. First, annuals cannot be directly seeded into areas treated with pre-emergence herbicides, for the annual seeds will not germinate. Second, the annuals should not be so dense as to shade or crowd out the permanent plants, nor should they impose severe competition for water and mineral nutrients. Third, as the ground cover plants enlarge and develop, fewer and fewer annuals can be introduced without disturbing the well-being of the permanent plantings.

—*Gary L. Koller*

*Out-of-the-ordinary . . .*

# GROUND COVERS FOR VARIETY

Andre Viette

We are all familiar with the common ground covers such as ivy, pachysandra and vinca. In recent years emphasis has also been given to hosta, liriope, ajuga and dwarf ornamental grasses. Each could be the subject of an article by itself, especially in view of the many varieties available with different growth habits and floral and foliage forms.

Here is a list of fourteen plants of unique value that should be used more often as ground covers. A judicious selection, based on landscape and cultural considerations should add interest and diversity to any garden. In general, these plants are surprisingly easy to grow and maintain. The hardiness zones (Arnold Arboretum map, inside back cover) given are approximate since they will vary according to location, wind, exposure, soil, protection, sun and moisture—even within a single garden.

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***Asarum europaeum*** — European Wild-Ginger
Zone 4 — Evergreen
Propagation: Division — Exposure: Shade

This has very attractive, round, glossy green leaves and grows to a height of 5″. It performs well under trees and shrubs, especially rhododendrons, and may self-sow in time. The small, urn-shaped flowers, which are hidden by the leaves, are greenish, purple or brown. Grown mainly for foliage.

***Astilbe chinensis pumila*** — Dwarf Creeping Astilbe
Zone 5 — Deciduous
Propagation: Division — Exposure: Light shade or sun if kept moist

One of the few astilbes with a creeping growth habit. The light green foliage, which is not glossy, forms an 8″-high mat. Lavender-rose flowers appear in July or August, later than most astilbes, and are borne on spire-like stalks about 15″ tall.

***Athyrium nipponicum 'Pictum'*** — Japanese Painted Fern
Zone 6 — Deciduous
Propagation: Division or spores — Exposure: Light shade to shade

Truly a gem. There are many forms of Japanese painted fern and all are unique because of their variegated foliage. They range in height from 6″ to 18″ and leaves vary in color combinations of silver, purple, cream, green, bluish-green and gray. New growth is slow to appear in spring. Usually sold as *A. goeringianum* 'Pictum'.

***Ceratostigma plumbaginoides (Plumbago larpentae)*** — Leadwort or Plumbago
Zone 6 — Deciduous to semi-evergreen
Propagation: Division or cuttings — Exposure: Sun to light shade

This brightens any rock garden, border or underplanting with deep cobalt-blue flowers from August until frost. Leadwort, a rapidly spreading ground cover, has 8″-tall foliage which exhibits a beautiful copper color in autumn. Plants leaf out in spring later than most.

***Chrysogonum virginianum*** — Goldenstar, Green-and-gold
Zone 6 — Evergreen or semi-deciduous
Propagation: Division or cuttings — Exposure: Light shade to shade

This member of the Daisy Family is a moderately strong grower which prefers a well-drained soil in a partially shaded, sheltered position. It has star-like yellow blooms from spring to summer and grows to a height of 8″.

*Andre Viette*

*Gary L. Koller*

(Above left) In shady areas *Disporum sessile* 'Variegatum' covers quickly and produces bell-shaped, creamy-white spring flowers. (Above right) The shiny, dark green leaves of European ginger contrast well with the light green whorls of sweet woodruff. (Below) The blue-green foliage and lilac-blue flowers of dwarf crested iris lend interest to shady corners.

*Andre Viette*

Japanese painted fern *(Athyrium nipponicum* 'Pictum') comes in a wide choice of frond color and variegation, including silver, purple and cream.

***Disporum sessile 'Variegatum'*** (No common name)
Zone 6 Deciduous
Propagation: Division Exposure: Shade

This woodland plant, which is derived from a species that is native to China and Japan, is related to fairy-bells. The beautiful lance-shaped leaves are cleanly striped with white, though slow to appear in spring. There are creamy white, bell-shaped flowers in spring. *Disporum sessile* 'Variegatum' grows to a height of 12" to 14" and will cover a shaded site quickly. A unique ground cover.

***Epimedium alpinum*** Alpine Barrenwort
Zone 6 Deciduous to semi-evergreen
Propagation: Division
Exposure: Light shade to shade (sun-tolerant if watered well in summer)

One of our finest ground covers, even surviving under trees where pachysandra and ivy have failed. This fast spreader grows to 8" or 10" in height and has great longevity. Its bright green foliage is touched with red and remains attractive for all but a few winter months. Light red-and-cream flowers in short sprays add charm to the garden before new leaves unfurl. *Epimedium pinnatum* (yellow flowers) also grows and multiplies well without attention. Both species tolerate dry shade.

***Geranium sanguineum prostratum (lancastriense)*** Lancaster Geranium
Zone 3 Deciduous
Propagation: Division or cuttings Exposure: Sun or light shade

Lancaster geranium flourishes in a sandy, well-drained soil. It flowers most of the summer with light pink blooms veined in crimson. In addition to having value as a ground cover it is also a must for the rock garden.

***Iris cristata*** Dwarf Crested Iris
Zone 3 Deciduous
Propagation: Division Exposure: Light shade to shade

This beautiful creeping iris enhances any shady spot with its lovely lilac-blue flowers and bluish-green foliage. Iris cristata is native to the eastern United States and grows to a height of 6", with a moderate-to-fast spreading rate. Do not heavily mulch this iris as it will rot. A white form is also very showy.

***Phlox stolonifera 'Blue Ridge'*** — Creeping Blue Phlox
Zone 2-3 — Deciduous
Propagation: Division or cuttings — Exposure: Light shade

This is a clear, light blue-flowered selection of a species which is native to Pennsylvania, Kentucky and Georgia. It grows moderately fast and graces the garden with beautiful flowers in April and May.

***Potentilla tridentata minima*** — Dwarf Three-toothed Cinquefoil
Zone 2 — Evergreen
Propagation: Division or cuttings — Exposure: Sun

In spring this little cinquefoil exhibits white flowers above its foliage but they are not very showy. It is grown for its attractive, glossy, trifoliate leaves and the fact that it will tolerate dry rocky places. A rapid grower, the plant adds much interest to the ground-cover garden.

***Rudbeckia fulgida 'Goldsturm'*** — Perennial Black-eyed Susan
Zone 5 — Deciduous
Propagation: Division — Exposure: Sun

This bright, showy plant provides three months of yellow summer color. It is a tall ground cover, growing to a height of 24″. Perennial black-eyed Susan is a useful, durable plant to naturalize in a meadow.

***Thymus serpyllum*** — Creeping or Wild Thyme
Zone 3 — Evergreen
Propagation: Division — Exposure: Sun

Creeping thyme can be naturalized in the wild garden or used in a more formal ground-cover planting. Its purple flowers appear from late spring to summer, and the plant is valuable where a 2″ mat is needed. Other prostrate thymes with white or red flowers are also excellent ground covers.

***Uvularia grandiflora*** — Big Merrybells
Zone 3 — Deciduous
Propagation: Division — Exposure: Light shade to shade

Merrybells' pendulous, 1″-long bell-shaped yellow flowers preceed attractive, bright green foliage in spring. This native American plant is extremely hardy and a very beautiful addition to the ground-cover garden.

*Andre Viette*

In summer Lancaster geraniums bloom nearly continuously, producing crimson-veined light pink flowers.

*New ideas for plant combinations . . .*

# MIXING BULBS AND PERENNIALS WITH GROUND COVERS

Michael H. Dodge

Covering the bare earth with a mass of plants that will tolerate poor growing conditions is a good garden practice, but it creates the problem of visual boredom if plantings are extensive. A large expanse of pachysandra or vinca is effective, but apart from flowers that disappear before one can notice them, it may lack interest after a time. A few durable perennials or bulbs artfully placed give seasonal appeal, while ferns can provide contrast in height and texture. Another approach is massing different kinds of ground covers.

There are two main types of ground covers, the low-growing or fine-leaved, and the taller or coarse-leaved plants. Of the wealth of plants available, select those that are hardy in your climate and which will receive the proper amount of light and moisture in your garden.

Soil preparation is necessary before planting. In dry, poor soils it is wise to mix in organic matter such as peat moss, manure or compost. Gypsum and coarse sand should be added to heavy, clay soils to improve drainage.

### With Low-growing Ground Covers

Companion plants for such ground covers as ajuga or vinca should be small, or their leaves should go dormant in early summer to prevent smothering the ground cover. The dwarf windflowers (*Anemone* species), with their brightly-colored, daisy-shaped flowers, and their botanical relatives, the hepaticas (*H. americana, H. acutiloba*), are perfect. The lacy foliage and curiously-shaped, white flowers of Dutchman's breeches (*Dicentra cucullaria*) and its cousin, squirrel-corn (*D. canadensis*), are certain to attract interest.

Suitable dwarf bulbs include species crocus, which have daintier flowers than the better known Dutch hybrids. Winter aconite (*Eranthis hyemalis*), with yellow flowers, tinted green, is an attractive plant and is especially enhanced by spring snowflake (*Leucojum vernum*), whose white petals are tipped green or occasionally yellow. Miniature narcissus, such as *N. asturiensis* (*minimus* of the trade), *N.* 'Little Beauty' and *N.* 'Little Gem', are delightful and easily grown little daffodils. The species tulips, such as *T. pulchella* 'Violacea', *T. tarda* and *T. linifolia*, are charming and merit greater attention; dependably perennial, they have blossoms which last much longer than traditional hybrid tulips. Among the earliest other bulbs is *Scilla tubergeniana*, with porcelain-blue and white flowers that are able to withstand the rigors of late winter's cold and snowy weather.

The airy gracefulness of ferns reduces

Michael Dodge

Although considered uncommon in the wild, Dutchman's breeches are one of the easiest woodland flowers to establish in the home garden.

George Taloumis

Mixed ostrich fern, Solomon's seal and maidenhair fern give contrasting layers of color and texture.

the monotony of some ground covers in summer. Maidenhair (*Adiantum pedatum*), and the hard-to-establish rattlesnake fern (*Botrychium virginianum*) are two handsome natives worth trying, as is the Japanese painted fern (*Athyrium nipponicum* 'Pictum') with its gray, green and burgundy-colored fronds. Summer-flowering perennials also help. A few suggestions: dwarf astilbes (*A. chinensis* 'Finale' and *A. c. pumila*), creeping lilyturf (*Liriope spicata*), and self-heal (*Prunella* 'Pink Loveliness' and 'White Loveliness').

Michael Dodge

The yellow flowers of the native merrybells can be a spring color punctuation to evergreen ground covers such as English ivy.

For sparkle in the autumn add a few cyclamen (*C. neapolitanum, C. europaeum*) or fall crocus (*C. speciosus, C. zonatus*), but beware of the giant autumn-crocus (*Colchicum*) because its leaves will engulf large areas of low-growing ground covers.

When winter in the Northeast sends ajuga into dormancy and makes even periwinkle (*Vinca minor*) look rather sparse, a few evergreen wildflowers are welcome. Three attractive ones are Oconee-bells (*Shortia galacifolia*), galax (*G. urceolata;* formerly *aphylla*), and wild-ginger (*Asarum shuttleworthii* and *A. europaeum*). The first two also have exquisite spring blossoms, while the strange flowers of gingers are hidden beneath their leaves. The evergreen Christmas fern (*Polystichum acrostichoides*) shines throughout the winter, especially when partially covered with snow.

**With Taller-growing Ground Covers**

Pachysandra, ivy and hosta can be interplanted with taller perennials and bulbs. The native merrybells (*Uvularia grandiflora*) with its yellow flowers cascading below bluish-green leaves deserves to be more widely grown. The starry flowers of bloodroot (*Sanguinaria canadensis*) and great white trillium (*T. grandiflorum*) put on a show before most ground covers recuperate from winter's onslaught. Two blue-flowered beauties, Virginia blue-bells (*Mertensia virginica*) and Siberian bugloss (*Brunnera macrophylla*), are easily grown; the latter has forget-me-not flowers and is usually sold as *Anchusa myosotidiflora*.

Some of the bulbs that can be naturalized under taller-growing ground covers are vigorous kinds of narcissus

Few spring flowers rival the arresting beauty of the pure white bloodroot.

*Michael Dodge*

(trumpet, flat-cup and pheasant's-eye) and Spanish bluebells (*Endymion hispanicus;* formerly *Scilla campanulata*). The trout- and glacier-lilies (*Erythronium revolutum* and *E. grandiflorum*) are some of America's finest bulbs and will grow with hosta or ivy. The stars-of-Bethlehem are European bulbs with elegant white and jade-green petals, the nodding *Ornithogalum nutans* flowering in spring, and *O. pyramidale* in midsummer. For spring bloom, despite its name, plant the summer snowflake (*Leucojum aestivum*).

A few perennials that blossom in late spring and provide contrast in height should be considered. The white flowers of Solomon's-seal (*Polygonatum commutatum*), baneberries (*Actaea rubra* and *A. pachypoda*), and false Solomon's-seal (*Smilacina racemosa*) are not only attractive at this time of year, but they also have showy autumn fruit. For pure pleasure nothing is lovelier than the brightly colored flowers of columbine jauntily tossing their heads in the early summer breezes. Astilbes, with their white, pink or red plumes, can be used as a primary ground cover or interplanted with others, in sun or shade, provided adequate moisture is available. A few spikes of native fairy-candles (*Cimicifuga racemosa*) add interest in summer, and the related Kamtchatka fairy-candles (*C. simplex*) gives life to gardens in October when they have little else of which to boast. *Cimicifuga* is usually given the unflattering names of bugbane or snakeroot.

Ferns are ideal plants for growing with tall ground covers for differences in texture, which many people prefer to bloom. Christmas fern and spiny woodfern (*Dryopteris spinulosa*) are two handsome

*George Taloumis*

Blue fescue (*Festuca ovina glauca)* combines striking color with delicate texture in a perennial mounded grass.

Michael Dodge

Ozark phlox blends well with other flowers, particularly astilbe.

evergreens. Of the many deciduous kinds, try using marginal woodfern (*Dryopteris marginalis*), glade fern (*Athyrium pycnocarpon*), ostrich fern (*Matteuccia pensylvanica*), cinnamon fern (*Osmunda cinnamomea*) and its cousin the interrupted fern (*O. claytoniana*). These nonflowering plants are worthy of homage in early spring as their fiddleheads unfurl.

There are a few other perennial ground-cover combinations that have proven to be very successful. The rare Ozark phlox (*P. pilosa ozarkiana*) with its delicate pink flowers is most effective when planted amongst the bronze-leaved astilbes. At Winterthur, H. F. du Pont planted a bed of the late-summer-flowering blue leadwort (*Ceratostigma plumbaginoides*) with the brilliant yellow of the so-called fall-daffodil (*Sternbergia lutea*). Although *Sternbergia* is related to narcissus, it looks more like a crocus. It has shiny, dark green leaves which are produced at blossom-time, and go dormant in spring. These colors, yellow and blue, can be repeated in spring with a dwarf forsythia, *F. viridissima* 'Bronxensis', and *Scilla sibirica* 'Spring Beauty'. Another early spring display of white epimedium (*E. youngianum* 'Niveum') with white grape-hyacinth (*Muscari botryoides* 'Album') brightens up a corner of the garden and requires little attention. The taller Armenian grape-hyacinth (*Muscari armeniacum*) will give early color to a planting of the lily-turf named after it (*Liriope muscari*). (The similarity between the flowers of these, appearing in different seasons, reminds us how often nature mimics herself.) For dry, sunny spots the stonecrops (*Sedum*), hens-and-chicks (*Sempervivum*) and prickly-pear cactus (*Opuntia humifusa*) utilize otherwise wasted ground.

A technique inspired by the Brazilian landscape designer, Roberto Burle Marx, is to use mass plantings of three or four ground covers with different foliage colors or textures, in curvilinear beds that echo the surrounding landscape. Following are some of the perennials that can be used in this manner.

PLANTS WITH GRAY FOLIAGE: Lamb's ears (*Stachys byzantina;* formerly *lanata*), pearly-everlasting (*Anaphalis margaritacea*), pussy-toes (*Antennaria dioica* 'Rosea'), pinks (*Dianthus*), blue fescue (*Festuca ovina glauca*), rue (*Ruta graveolens* 'Blue Beauty'), Silver Mound artemisia (*A. schmidtiana* 'Nana') and blue-leaved plantain-lily (*Hosta sieboldiana*).

PLANTS WITH YELLOW FOLIAGE: Golden money wort (*Lysimachia nummularia* 'Aurea'), golden thyme (*Thymus vulgaris* 'Aureus'), golden feverfew (*Chrysanthemum parthenium* 'Aureum') and golden meadowsweet (*Filipendula ulmaria* 'Aurea').

PLANTS WITH VARIEGATED FOLIAGE: Tricolor sage (*Salvia officinalis* 'Tricolor'), goutweed (*Aegopodium podagraria* 'Variegatum'), silver-edge pachysandra (*P. terminalis* 'Variegata'), dead-nettles (*Lamium maculatum* cultivars), and variegated forms of some grasses (*Molinia caerulea, Carex morrowi, Miscanthus sinensis* and the beautiful *Hakonechloa macra*).

PLANTS WITH RED OR BRONZE FOLIAGE: Bronze-leaf ajuga (*A. reptans* 'Gaiety' or *A. r.* 'Bronze Beauty'), purpled-leaved sage (*Salvia officinalis* 'Purpurea'), dwarf lily-turf (*Ophiopogon planiscapus* 'Nigrescens'), bronze-leaf stonecrop (*Sedum maximum* 'Atropurpureum'), firecracker sundrop (*Oenothera tetragona* 'Illumination'), and bronze-leaf Rodgersia (*R. podophylla*).

*There are rugged and dependable . . .*

# GROUND COVERS FOR THE FAR NORTH

Roger Vick

The University of Alberta Devonian Botanic Garden was founded in 1959. For some 20 years the Garden has introduced and tested a wide variety of ornamental plants and evaluated their potential for central Alberta.

Severe temperatures and desiccation both take their toll, restricting the number of satisfactory trees and shrubs that can be grown in this region. On the other hand, a wide selection of herbaceous perennials are grown in central Alberta and throughout the Canadian prairies, protected by a more-or-less reliable snow cover for much of the six-month winter. This discussion of ground covers includes only those species that are reliably hardy not only here but also in areas of even lower precipitation and unreliable winter snow cover.

### Climate

The yearly mean temperature is 37°F (3°C), with a peak minimum of −56°F (−49°C), and peak maximum of 98°F (37°C). The last spring frost date falls on about June 1st and the first autumn frost occurs about September 4th (all dates are mean statistics). This allows a frost-free growing season of some 95 days. The start of the growing season for perennials—mean temperature above 42°F (5.5°C)—is April 23rd, and the end of the season is October 8th.

Precipitation is not high. The annual mean is 19 in. (47 cm.), with 5.1 in. or 13 cm. equivalent being snow. The average humidity is 61%. A midsummer day-length of 17 hours allows plants to make the most of a short season.

### Ground Covers

With the exception of *Juniperus horizontalis*, a low evergreen, and *Eriogonum umbellatum*, which is sub-shrubby, the following ground covers are herbaceous perennials. All are readily propagated by division, although *Dianthus deltoides* is best increased from seed. Most of the following ground covers retain foliage through winter, but this is of little consequence where they are blanketed by snow until spring.

***Aegopodium podagraria 'Variegatum'*** (Goutweed). Only the variegated form, with white-margined foliage, is normally offered commercially. It tolerates shade and is one of our most vigorous and reliable ground covers.

Because it can become invasive, goutweed is best used where there is a physical barrier between it and lawns or other plantings such as between the side of a building and a path where the roots will be contained. It produces an attractive effect in island beds and is used in parking-lot dividers.

***Cerastium tomentosum*** (Snow-in-summer) is sometimes scorned as being too easy to grow, but this is a definite advantage in ground cover situations. The low spreading mounds of silvery foliage are ornamental in themselves but are further enhanced by twinkling white stars of flowers in spring and early summer. If left undisturbed for a number of years the center tends to die out, so it is best to lift the roots and divide them with a sharp spade every second or third season just prior to spring growth. Plants spaced up to three feet apart will fill in within two or three months. Very happy in sun and well drained soils.

***Dianthus deltoides*** (Maiden Pink) can be relied upon to form dense low mats and to spread vegetatively and by seed. The foliage is of fine, dark green texture, and the red, white or pink flowers appear profusely in spring and early summer. Cultivars such as 'Brilliancy' are available. Propagation is by seed, which is best sown *in situ* in late autumn, to germinate the following spring.

*Aegopodium podagraria variegatum,* or variegated goutweed, is a handsome ground cover, despite its rather pedestrian name. A physical barrier is needed between it and lawns because the roots can be invasive.

***Eriogonum umbellatum*** (Umbrella-plant) is rarely seen in gardens but is native to the Alberta foothills and has been used to good purpose in sunny locations. In milder regions *Eriogonum* species suffer from winter wet but on the Canadian prairies have proven perfectly hardy and densely mat-forming. The flowers, borne in umbels on stems about 8 in. (20 cm.) tall, are pale yellow becoming tinged with rose as they age. Foliage produces autumn tints. Although it spreads steadily, the umbrella-plant is not invasive. Propagation by division.

***Fragaria virginiana*** (Wild Strawberry) has the advantage of being hardy, and it is easily propagated from self-rooting stolons. The more adventurous gardener may wish to accept a little more height and try one of the fine fruiting cultivars.

***Glechoma hederacea 'Variegata'*** (Variegated Creeping Charlie) has obtained a bad name where allowed to colonize lawns, alpine gardens or other choice plantings. However, in sunny or shady areas where root barriers can be used this green-and-yellow foliage plant can be relied upon to succeed as a ground cover.

***Juniperus horizontalis.*** Creeping juniper is often overlooked as a ground cover, possibly because of the initial expense. Certain cultivars such as 'Prince of Wales' and 'Douglasii' are excellent for sunny, well-drained locations. Their main disadvantage is that, in order to obtain a satisfactory effect in the first two or three years, they should be planted about one foot apart. In later years they spread to nine feet or more in diameter, necessitating the removal of alternate plants.

***Lysimachia nummularia*** (Creeping Jenny, Moneywort) is a small-leaved, prostrate grower valued for its success in moist and shady areas. In such locations it will spread very rapidly by creeping stems. Flowers are bright yellow in midsummer. There is also a golden-leaved cultivar. Propagation is by division.

***Potentilla anserina sericea*** (Silverweed) prefers moist and sunny locations but will

George Taloumis

Dianthus, dwarf *Euonymus alata*, lilies and rosemary line the terrace while thyme is used as an exceptionally fragrant ground cover.

tolerate adversity with little complaint. The silvery foliage is pinnately divided, providing a fine texture. The plant creeps with confidence by stolons in the manner of the strawberry. The yellow flowers take second place to the foliage. As with many successful ground covers, silverweed should not be planted in close proximity to less robust species.

***Thymus serpyllum*** (Wild Thyme, Mother-of-thyme) and closely related species. Densely mat-forming, low and very suitable for sunny, well-drained places. The deep pink flowers are borne profusely, often smothering the center of the plant to death, leaving only the vegetative growth around the outside to continue the following season. Wild thyme, which is readily divided, is popular as a soil binder in light soils that are subject to erosion. Volunteer seedlings may become weedy in choice plantings.

# GROUND COVERS FOR SOUTHWESTERN GARDENS

Carl Zangger

The Southwest is a unique region of the United States in that the climate can be so variable. It ranges from subtropical in the coastal areas of southern California to alpine in the mountains to extremely dry in the desert areas. In fact, within the range of just a few miles it is possible to experience all these conditions. However, much of the Southwest is arid, experiencing little or no rainfall for several months of the year. Supplemental irrigation or watering systems are a must for successful gardens.

It is difficult to generalize in recommending plant varieties for such a varied region. Gardeners are urged to determine the climate in which they plan to plant before actually making a selection. Local arboretums, university cooperative extension services, as well as landscape architects, contractors and nurserymen are all sources of help both for determining the climate and securing information on plant varieties.

The following list is not intended to be complete, but it comprises the varieties most frequently used in this region.

***Ajuga*** BUGLE Zone 4 Sun or Shade
Very popular in most of the Southwest. The majority are rapid growers and form a thick carpet of attractive green or bronze foliage through the growing season. In milder parts of our area they are nearly evergreen. Flowers, usually blue, are profuse in spring, nearly hiding the foliage. Ajugas benefit from reasonably well-drained soil and require plenty of moisture. They may be grown in full sun in most areas provided they receive adequate watering, but shade is preferable in the hot inland valleys. There are several widely planted kinds: low-growing *A. reptans, A. r.* 'Atropurpurea', and taller variants including crisp-leaved 'Jungle Green' and 'Jungle Bronze'.

***Arctotheca calendula*** CAPE WEED
Zone 9 Sun
There is hardly a day of the year when this attractive low-grower is not displaying its single yellow daisy-like flowers in profusion. It grows rapidly, forming a thick bed of gray-green foliage that is retained in winter. Cape weed spreads rapidly by runners and is excellent for erosion control on banks. Good in borders, too. Tolerant of heat and drought. Grows best in improved soil, but appearance acceptable in relatively poor soil.

Los Angeles Times

Ornamental strawberry *(Fragraria chiloensis)* fills in quickly with runners and can be mowed to freshen the appearance.

***Baccharis pilularis*** COYOTE-BUSH
Zone 8 Sun
This California native is a real problem solver. It is drought tolerant yet performs well in high-rainfall areas if drainage is fast. Fairly rapid growth, to 2′ in height, and spreading to 3-4′. Candidate for a steep bank, where it will naturally drape to the contour of the land. Evergreen, attractive year-round. Flowers rather inconspicuous; sexes are borne on different plants. Nurseries usually propagate the male form because the female sets cottony seed heads which can be a nuisance when they ripen and blow about.

***Campanula poscharskyana***
SERBIAN BELLFLOWER Zone 3 Shade
In spring this hardy variety puts on a display of small lavender-blue flowers that nearly hide the foliage. Leaves are round, ½-¾″ in diameter. Plants grow normally 6-10″ in height and spread from underground roots, forming a solid bed when mature. Serbian bellflower is an excellent filler under shrubs and one of the relatively few plants that will perform well in shade. Provide reasonably good soil and plenty of water. *Campanula garganica*, Dalmatian bellflower, is similar but slightly smaller, both in growth and in flower. Flowers are violet-blue and star-shaped.

***Cerastium tomentosum*** SNOW-IN-SUMMER
Zone 2 Sun
Attractive little creeper with silver foliage. In spring it is a snowbank of small white starry flowers. The rest of the year *Cerastium* presents a relatively neat gray-green carpet about 6″ high. If growth becomes uneven, it may be trimmed back lightly. Drought tolerant and requiring little care. Not fussy about soil but should have reasonably good drainage.

***Fragaria chiloensis*** ORNAMENTAL STRAWBERRY Zone 8 Sun or light shade
Dark green leaves form a thick cover 6-8″ high. Attractive single, white, yellow-centered flowers in spring. Sends out runners which root as they grow. Give regular and ample watering. Plants may be mowed once a year to eliminate old growth and provide fresher appearance. A parent of the garden strawberry.

***Gazania*** SOUTH AFRICAN DAISY
Zone 9 Sun
In southern California particularly, this plant is one of the most colorful and longest flowering of any ground cover. There is hardly a season when gazanias are not in bloom with their 2″-wide flowers of brilliant colors, mostly in shades of yellow, orange, bronze, white and combi-

*All pictures*, Los Angeles Times

A splendid warm-climate perennial, gazania can also be used as an annual in the North.

nations. They are drought resistant, grow rapidly and perform well in relatively poor soil. Generally available in two principal growth types—clumping and trailing. CLUMPING TYPES include: 'Copper King'—huge 4-5", bronze red; 'Fiesta Red'—copper red, dark foliage; 'Gold Rush'—clear golden orange, black-ringed center. TRAILING GAZANIA is available in yellow, orange, bronze and white. Plants have clean silver-gray foliage, grow 6-10" tall, make a rapid cover and look good all year. Excellent for both banks and beds.

**Algerian and English Ivies**
Zone 5-9 Sun or shade
One of our most widely used plant groups because of clean, fresh, year-round appearance and ease of culture. Ivies appreciate ample summer watering. There are many types to choose from. The following are among the best and most widely used:

***Hedera canariensis*** ALGERIAN IVY Zone 7, 8. Big dark green leaves, often 6" across; for banks and borders.

Algerian ivy *(Hedera canariensis)*

***Hedera helix*** ENGLISH IVY Zone 5. Hardy, grows and spreads rapidly, provides dense cover; dark green, heavily veined leaves 2-3" across. *H. h.* 'Hahn's Self-branching' ('Hahnii') Zone 6. Smaller, lighter green leaves than typical English ivy and slightly less vigorous; more compact and softer effect. *H. h.* 'Needlepoint' Zone 6—a much smaller leaf than 'Hahn's Self-branching,'and with sharp-pointed tip; good dark green color and compact growth habit.

English ivy *(Hedera helix)*

**Iceplant** Various species
Zones 8-10 Sun
Several kinds, all succulents, with varying growth habits. In California this group is one of the most widely used for ground covers. Of rapid growth and drought tolerant; most are spectacular in bloom. The following are often seen:

***Carpobrotus edulis*** FIG-MARIGOLD Zone 9. Rugged, heavy, three-cornered leaves 3-4" long. Big 3"-wide cream-colored flower. Height: 10-12".

***Delosperma 'Alba'*** WHITE ICEPLANT Zone 9. One-inch triangular leaves and olive-green color. Small white flowers. Height 6-8".

***Drosanthemum hispidum*** ROSEA ICE-PLANT Zone 10. A blanket of lavender pink in spring. Low mat-like growth, 4-6″ high. One of the best for steep slopes.

***Lampranthus aurantiacus*** BUSH-TYPE ICE-PLANT Zone 9. Blooms early spring; yellow, gold and orange flowers. Low bushy growth 10-15″ tall. Excellent for borders and beds.

***Lampranthus productus*** PURPLE ICE-PLANT Zone 9. Earliest to bloom, starting in January and continuing for months. Bright purple color is spectacular. Spreading growth habit. 10 to 12″ tall.

***Lampranthus spectabilis*** TRAILING ICE-PLANT Zone 9. Blooms are red, rose, light pink, lavender and purple. A blanket of fluorescent color. Trailing growth habit. Gray-green foliage 6-12″ tall.

***Maleophora (Hymenocyclus) crocea purpureocrocea*** CROCEUM ICEPLANT Zone 8. Most frost-hardy of iceplants and one of the toughest. One-to-two-inch gray-green leaves. Coppery-red or yellow flowers most of the year.

***Lonicera japonica*** **'Halliana'** HALL'S JAPANESE HONEYSUCKLE Zone 5 Sun
One of our hardiest woody vines and used successfully over most of North America, though a familiar escape in the South. In California it is planted extensively on banks from the seashore to the mountains and deserts. Height as a ground cover: 2′. Plants spread rapidly and grow well in almost any soil. Light green foliage is retained year-round where winters are mild, but plants go dormant in areas with cold winter temperatures. A generous bloomer in summer with attractive yellow flowers that are pleasantly fragrant. There is also a bronze-leaved variety.

***Ophiopogon japonicus*** MONDO-GRASS Zone 6 Sun or shade.
Dark grass-like foliage is evergreen. Plants form clumps about 10″ tall and eventually become very dense. Extremely adaptable and can be planted in sun in all but desert areas. Does equally well in shade. Appreciates ample amounts of water in summer particularly if grown in sun. Mondo-grass requires little attention and may be used as borders or mass plantings, where it will look the same at every season.

***Osteospermum fruticosum*** TRAILING AFRICAN DAISY Zone 9 Sun
Few plants can equal this daisy for a dazzling display of spring and summer bloom. Big (2″-wide) flowers, ranging from white to purple in color, hide foliage during bloom period. Rapid growing, reaching a height of 18″ and sending out runners 2-3′ long. Foliage is bright green all year. Drought resistant but requires summer watering. Excellent for planting on hillsides, also along roadway banks. For this reason plants are often referred to as Freeway Daisies. Osteospermum is planted from the seashore to the inland valleys and even the warmer desert areas. Because this daisy grows vigorously it is sometimes necessary to prune in autumn to remove some of the accumulated old growth.

***Phyla nodiflora (Lippia canescens repens)*** LIPPIA Zone 9 Sun
A good lawn substitute, lippia sends out strong runners that form a tightly knit sod. It may be mowed or left to grow naturally. Height: 6″. In summer it blooms with little button-like, lavender-pink flowers of which bees are fond. Thrives in heat. Semi-dormant in winter but never entirely brown. Tolerates considerable traffic and is often used in parking strips for that reason. Though drought resistant, lippia must have a fair amount of summer watering to look its brightest.

***Potentilla verna*** SPRING CINQUEFOIL Zone 6 Sun or light shade
This plant with strawberry-like leaves is one of the most trouble-free available. Runners spread rapidly and are clothed in dark green foliage that is evergreen in mild areas. Forms a thick, tough mat 3-6″ high. In spring and early summer it blooms heavily with charming ½″-wide, buttercup-like flowers of bright yellow. If it becomes untidy, it may be mowed and will quickly regrow. Useful in any size spaces, on banks or flat areas, in sun or shade. In our region spring cinquefoil appreciates watering and will look its brightest if fertilized from time to time.

***Rosmarinus officinalis* 'Prostratus'** PROSTRATE ROSEMARY Zone 8 Sun
The dark evergreen foliage of this spreading shrub is attractive the year around. It will grow 2½′ tall and spread 4′ or more. In spring and summer abundant light blue flowers are produced. Rosemary is not particular about soil and seems to adapt well wherever used. Planted on banks it will follow the contour of the slope and even drape over a wall. Drought and wind resistant.

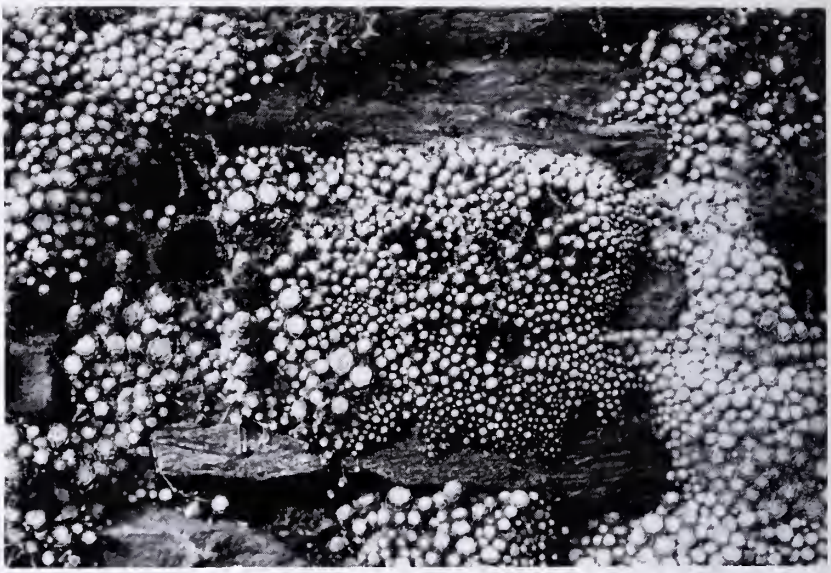
***Saxifraga stolonifera (sarmentosa)***
STRAWBERRY-BEGONIA Zone 7 Shade
Ground covers for shade are not plentiful here, but in frost-free areas this does an excellent job. Height: generally not over 6″. The rounded leaves with red veins are 2″ wide, attractive all year. Spring bonus—tall spikes of dainty white to soft pink flowers. Plants must have a fairly moist condition to grow well. They also benefit from a humus-rich soil.

***Sedum*** STONECROP Zone 3-8 Sun
There are many types in this group of succulents. Some reach several feet in height, others are low creepers. The majority are not particular about soils and will be found persisting even in very poor rocky areas but, like most plants, perform better under good garden conditions. For the most part drought resistant, in the Southwest they should receive modest amounts of water through the dry seasons. Following are a few of the low creepers that are outstanding for ground covers: *Sedum anglicum*—2-3″ high, yellow flowers in spring; *S. brevifolium*—2-3″ high, white flowers; *S.* x *rubrotinctum* (*guatemalense*)—6-8″ tall, bronzy red foliage, yellow flowers; *S. spurium* 'Dragon's Blood'—3-4″ high, bronzy rosette foliage, rosy red bloom.

***Soleirola (Helxine) soleirolii*** BABY TEARS, HELXINE Zone 9 Shade
For shady, relatively frost-free areas this delightful little carpeter is one of the few plants that really performs well. It needs plenty of moisture and grows moderately fast, covering the ground with a bright green carpet of tiny round leaves that look the same at every season. Nice under other shade-loving plants but can be used around stepping stones, in rock gardens, bonsai dishes and terrariums. It

Croceum iceplant in bloom

Los Angeles Times



M. Joyner

Several varieties of stonecrop *(Sedum)* planted vertically in a stone wall.

is undemanding as to soil. Growth is generally under 6″ and may be trimmed so plants cling tightly to the ground.

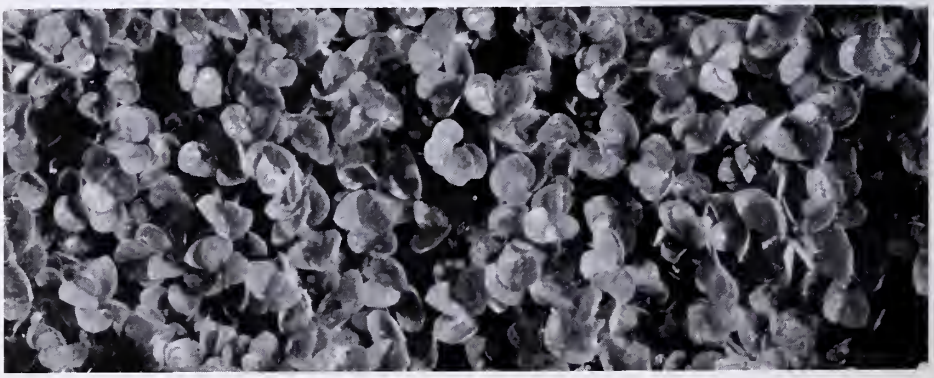
***Vinca major*** BIG PERIWINKLE Zone 7 Sun or shade

A very rugged plant for covering banks and steep slopes. May be planted from the seashore to the mountains. In desert areas shade is required. Dark green oval leaves on trailing stems root as they spread. Excellent for erosion control. It grows rapidly, 18-24″ tall, in nearly all soils. In spring there is a wealth of 1″-wide blue flowers. Aging plantings may be mowed in winter to remove old thatch and give a more uniform spring and summer appearance. Appreciates and looks best with plenty of water but will tolerate some dryness.

***Vinca minor*** PERIWINKLE, MYRTLE Zone 4 Sun or shade

Foliage is smaller and darker than *V. major*. It also grows less vigorously and lower (12″). Makes a dense cover with nice year-round appearance. In spring it blooms heavily with attractive blue flowers about ¾″ in diameter. Should receive plenty of water in the hotter months.

Baby's tears or helxine, a dense ground cover with very tiny leaves.



Hank Hoag

# VINES IN CALIFORNIA

## Philip E. Chandler

Drier and more variable climatically than south Florida and the far south of Texas, California in its mildest portions grows most of the vines recommended for both temperate and humid subtropical zones. Notable tender evergreen climbers common in southern California include:

EASTER-LILY VINE (*Beaumontia grandiflora*). Very large-leaved, woody-stemmed twiner best grown on strong arbor; fragrant white chalice-like flowers in generous clusters spring through warm season. Place in lee of prevailing wind where warmth accumulates.

BOUGAINVILLEA hybrids grown for brilliant flower bracts. Plant in hottest location; strong reflected light is beneficial, also occasional deep watering once established. Magenta and most red-flowered forms rampant; burnt-orange to salmon and gold cultivars less vigorous; pinks and near-white weak growers. Foliage poor in cold weather.

KANGAROO VINE (*Cissus antarctica*), with leathery, simple leaves, is rampant in sun or shade, in dry or wet soil. Effective for ground cover or screening, particularly for covering chain-link fence. Quiet, neutral green, tenacious.

*C. hypoglauca,* perhaps the most decorative of the *Cissus,* has palmately compound leaves with coppery new growth, conspicuous tendrils. *C. rhombifolia*—leaves more openly structured than above; useful as ground cover, climber or spiller; shear for density. *Rhoicissus capensis* suggests an evergreen form of the domestic grape; very bronzy new growth and tendrils, bright surfaced, rather large, simple leaves, some deeply lobed.

ORCHID TRUMPET VINE (*Clytostoma callistegioides; Bignonia violacea*). Pinkish-lavender trumpet flowers are conspicuous in late spring. Plants take sun or considerable shade, almost any soil. Few predators or diseases.

RED TRUMPET VINE (*Distictis buccinatoria*) is a rampant grower with magnificent dark foliage. Hanging clusters of large yellow-throated orange-red flowers fade rose-red, from midspring to winter; sun, filtered shade. *D. laxiflora,* the vanilla-scented trumpet vine, is a slow grower with foliage not so dense or glossy. Light blue-purple flowers fade

Bougainvillea, the ubiquitous warm climate vine, thrives on heat and strong light.

*J. Horace McFarland*

pale lavender, summer through autumn. *D.* 'Rivers' is like the red trumpet vine except flowers are rosy purple with near-orange throat; foliage is less abundant, growth slower.

CAROLINA JESSAMINE (*Gelsemium sempervirens*), described elsewhere in this Handbook for other zones, is almost fool-proof in sun or light shade. It flowers from late autumn through spring and is not rampant in California.

*Hardenbergia comptoniana* is a vigorous, open-textured vine for sun or light shade. Small purple pea-shaped flowers in drooping clusters are conspicuous from late January to April; narrow trifoliate leaves subject to leafeaters.

WAX VINE (*Hoya carnosa*), a dull-green climbing succulent, can cope with full shade, even dry shade, and poor air circulation. Tolerates containers, limited root room. Summer flowers are dusty pink, waxen.

*Mandevilla* 'Alice du Pont' is a tender twiner for a very protected exposure. Flowers are large, funnel-form, clustered, strongly pink, continuous with warm weather. Handsome ribbed leaves become sparse in winter.

*Pandorea* (*Tecoma*) *jasminoides*. Light green, pinnate leaves form open structure. Conspicuous flowers are pinkish white with crimson throat, abundant in summer, autumn. Variety *rosea* is lavender-pink and *alba* pure white. All appreciate accumulated heat, protection from ocean wind.

*Stephanotis floribunda*. This elegant dark green, oval-leaved twiner can be effectively trained on heavy chain from eaves. Large-clustered flowers, borne in summer, are white, waxen, fragrant. Plant where roots are shaded, vine in half-day sun.

CAPE-HONEYSUCKLE (*Tecomaria capensis*) is an extremely vigorous climbing (or spilling) shrub. Leaves are handsomely pinnate, deep green; flowers are red-orange in upright terminal clusters, especially conspicuous late summer into winter. Plants take hottest sun or partial shade. No pests.

# Ground Covers for Semi-Arid Regions

This area comprises southern Nevada, southern Utah, California desert regions, Arizona, New Mexico and southwestern Texas. It is very diverse in climate, but one common feature is low rainfall combined with high summer heat. Some parts such as the low deserts of southern California and Arizona experience minimal winter frosts; the higher plateaus are subject to severely cold winter temperatures. Soils generally need the addition of humus, and a supplementary watering system is essential. Spring and autumn applications of high-nitrogen fertilizer are usually desirable. Soil pH tends to be high and water quality is variable, often saline. As in other areas, the gardener is urged to consult with local extension authorities and other horticultural sources concerning appropriate ground covers.

Many of the ground covers on the previous list are used here—cape weed, trailing gazania, coyote bush, lippia, Hall's Japanese honeysuckle, spring cinquefoil, prostrate rosemary and big periwinkle. Other ground covers of note: Sprengeri-fern (*Asparagus densiflorus* 'Sprengeri') (Zone 9) (sun or shade), whose soft plumy foliage reaches a height of 18″ and creates a billowy effect; gray lavender-cotton (*Santolina chamaecyparissus*) (Zone 6) (sun), with soft yellow button-like flowers in summer and height of 18-24″ which may be kept lower by trimming; prostrate germander (*Teucrium chamaedrys* 'Prostratum') (Zone 5) (sun), having small, bright green leaves retained nearly year round in milder areas, 4-6″ spikes of rosy-lavender blooms, and a height of 8-10″. It is deeply rooted and binds the soil well.

—*Carl Zangger*

George Taloumis

Summer grape *(Vitis aestivalis)*

# VINES FOR EVERY PURPOSE

## Whether for showy flowers, colorful fruits, fine foliage or special situations, selection is all important

Donald Wyman

Vines should be selected with great care. It will be most helpful to go through catalogs or to visit nurserymen or botanic gardens because too often the popular one is not the best. To help select the right type, the following will be useful. Not a list of "the best" vines, (almost every one of them has its limitations), nevertheless it should aid in the search for just the right vine for a particular purpose.

George Taloumis

Henry clematis (*C. lawsoniana* 'Henryi')

## For Flowers

There are many of these, both slow and fast growing. Some, like the wisterias, fail to flower satisfactorily under certain conditions; and others, like the clematis clan, require special care and soil in order to produce a profusion of flowers. On the other hand, the fleece vine and the trumpet creeper will grow well under many different conditions, and so, naturally, are among those that are frequently seen. Some of the others are decidedly worth trying in order to produce good flowers, and a close study of the articles in this Handbook will aid materially in this respect. Flowering periods vary from place to place. The dates given here are for northeastern United States except the ones for vines that grow only in warm climates, marked (W). Hardiness zones are taken from the Hardiness Map of the Arnold Arboretum (inside back cover).

| Common Name | Scientific Name | Time of Blooming | Hardiness Zone |
|---|---|---|---|
| | Bloom More or Less Continuously in Warm Climates | | |
| Coralvine | *Antigonon leptopus* | Continuously | 9 |
| Glorybower | *Clerodendrum speciosum* | Continuously | 9 |
| Bleedingheart glorybower | *Clerodendrum thomsoniae* | Continuously | 9 |
| Mexican blood trumpet vine | *Distictis buccinatoria* | May-Sept. or all year in some places | 10 |
| Maypop, Passion flower | *Passiflora incarnata* | Continuously | 7 |
| Jasmine nightshade | *Solanum jasminoides* | Continuously | 9 |
| | Spring and Early Summer Bloom | | |
| Anemone clematis | *Clematis montana* | May-June | 6 |
| Pink clematis | *Clematis montana rubens* | May-June | 5 |
| Yellow honeysuckle | *Lonicera flava* | May-June | 5 |
| Cherokee rose | *Rosa laevigata* | May | 7 |
| Rambler rose | | June | 4-5 |
| Chinese star-jasmine | *Trachelospermum jasminoides* | April-July | 7-8 |
| Japanese wisteria | *Wisteria floribunda* | May | 4 |
| Long-cluster Japanese wisteria | *Wisteria floribunda* 'Macrobotrys' | May | 4 |
| Pink Japanese wisteria | *Wisteria floribunda* 'Rosea' | May | 4 |
| Chinese wisteria | *Wisteria sinensis* | May | 5 |

| Common Name | Scientific Name | Time of Blooming | Hardiness Zone |
|---|---|---|---|
| | SUMMER BLOOM | | |
| Trumpet creeper | *Campsis radicans* | mid-July-Sept. | 4 |
| Curly clematis | *Clematis crispa* | June-Aug. | 5 |
| Stanavoi clematis | *Clematis fusca* | June-Aug. | 5 |
| Jackman clematis | *Clematis jackmanii* | mid-July | 5 |
| Henry clematis | *Clematis lawsoniana henryi* | June-Aug. | 5 |
| Italian clematis | *Clematis viticella* | June-Aug. | 5 |
| Kermes clematis | *Clematis viticella kermesina* | June-Aug. | 5 |
| Climbing hydrangea | *Hydrangea anomala petiolaris* | June-July | 4 |
| Everblooming honeysuckle | *Lonicera heckrottii* | June-Sept. | 5 |
| honeysuckle | *Lonicera henryi* | June-Aug. | 4 |
| Hall's Japanese honeysuckle | *Lonicera japonica* 'Halliana' | June-Sept. | 4 |
| Woodbine honeysuckle | *Lonicera periclymenum* | June-Aug. | 4 |
| Trumpet honeysuckle | *Lonicera sempervirens* | May-Aug. | 3 |
| Tellmann honeysuckle | *Lonicera tellmanniana* | June-Sept. | 5 |
| Chinese honeysuckle | *Lonicera tragophylla* | June | 6 |
| Passion flower | *Passiflora caerulea* | June-Sept. (W) | 7-8 |
| Bengal clockvine | *Thunbergia grandiflora* | midsummer (W) | 8 |
| Regel's threewingnut | *Tripterygium regelii* | July | 4 |
| | LATE SUMMER AND FALL BLOOM | | |
| October clematis | *Clematis apiifolia* | Sept.-Oct. | 4 |
| Jouin clematis | *Clematis jouiniana* | Aug.-Oct. | 4 |
| Western virgin's bower | *Clematis ligusticifolia* | Aug.-Sept. | 5 |
| Sweet autumn clematis | *Clematis paniculata* | Sept.-Oct. | 5 |
| Scarlet clematis | *Clematis texensis* | July-Sept. | 5 |
| Virgin's bower | *Clematis virginiana* | Aug.-Sept. | 5 |
| Cup-and-saucer vine | *Cobaea scandens* | July-frost | 9 |
| Tanglehead | *Pileostegia viburnoides* | late Aug.-Sept. (W) | 7 |
| Silver fleece-vine | *Polygonum aubertii* | Aug.-Sept. | 4 |
| Memorial rose | *Rosa wichuraiana* | Aug.-Sept. | 5 |
| Costa Rican nightshade | *Solanum wendlandii* | July-Oct. (W) | 9 |

J. Horace McFarland

Scarlet clematis *(C. texensis)* in flower

Roche

Virgin's bower *(Clematis virginiana)* seed pods

## For Colorful Fruits

| Common Name | Scientific Name | Time of Blooming | Hardiness Zone |
|---|---|---|---|
| Porcelain ampelopsis | *Ampelopsis brevipedunculata* | autumn | 4 |
| Oriental bittersweet | *Celastrus orbiculata* | autumn-winter | 4 |
| American bittersweet | *Celastrus scandens* | autumn-winter | 2 |
| Clematis | *Clematis*-most species | summer-autumn | 4-5 |
| Big-leaf wintercreeper or evergreen bittersweet | *Euonymus fortunei vegeta* | autumn | 5 |
| Running euonymus | *Euonymus obovata* | autumn | 3 |
| Scarlet kadsura | *Kadsura japonica* | autumn | 7 |
| | *Parthenocissus* species | autumn | 3-4 |
| Himalayan magnolia-vine | *Schisandra propinqua* | autumn | 8 |

## Open Growing

The following vines should not be selected for a screen. They do not make a dense mass of foliage, but they do have merit in adding the beauty of foliage outline to the interesting architectural features of a trellis or lattice work.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Porcelain ampelopsis | *Ampelopsis brevipedunculata* | 4 |
| Curly clematis | *Clematis crispa* | 5 |
| Jackman clematis | *Clematis jackmanii* | 5 |
| Jouin clematis | *Clematis jouiniana* | 4 |
| Western virgin's bower | *Clematis ligusticifolia* | 5 |
| Golden clematis | *Clematis tangutica obtusiuscula* | 5 |
| Kermes clematis | *Clematis viticella* 'Kermesina' | 5 |
| Everblooming honeysuckle | *Lonicera heckrottii* | 5 |
| Woodbine honeysuckle | *Lonicera periclymenum* | 4 |
| Trumpet honeysuckle | *Lonicera sempervirens* | 3 |
| Tellmann honeysuckle | *Lonicera tellmanniana* | 5 |
| Chinese honeysuckle | *Lonicera tragophylla* | 6 |
| Firecracker vine | *Manettia glabra* | 10 |
| Virginia creeper | *Parthenocissus quinquefolia* | 3 |
| Cherokee rose | *Rosa laevigata* | 7 |

## Rapidly Growing

If one wishes a vine rather than a shrub or a tree to cover some unsightly obstacle quickly or to provide a screen in a short time, these are the vines for this purpose. They are all fairly dense in habit and any one of them can be made denser merely by a little pruning. In this group will be found clinging vines as well as those that twine.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Bower actinidia | *Actinidia arguta* | 4 |
| Chinese gooseberry | *Actinidia chinensis* | 7 |
| Kolomikta actinidia | *Actinidia kolomikta* | 4 |
| Silvervine actinidia | *Actinidia polygama* | 4 |
| Fiveleaf akebia | *Akebia quinata* | 4 |
| Pepper-vine | *Ampelopsis arborea* | 7 |
| Porcelain ampelopsis | *Ampelopsis brevipedunculata* | 4 |
| Coralvine | *Antigonon leptopus* | 9 |
| Dutchman's pipe | *Aristolochia durior* | 4 |
| Crossvine | *Bignonia capreolata* | 6 |
| Trumpet creeper | *Campsis radicans* | 4 |
| Oriental bittersweet | *Celastrus orbiculata* | 4 |
| American bittersweet | *Celastrus scandens* | 2 |
| Anemone clematis | *Clematis montana* | 6 |
| Sweet autumn clematis | *Clematis paniculata* | 5 |
| Scarlet clematis | *Clematis texensis* | 5 |
| Virgin's bower | *Clematis virginiana* | 4 |
| Travelers' joy | *Clematis vitalba* | 4 |
| Italian clematis | *Clematis viticella* | 5 |
| Cup-and-saucer vine | *Cobaea scandens* | 9 |
| Mexican blood trumpet vine | *Distictis buccinatoria* | 10 |
| Creeping fig | *Ficus pumila* | 9 |
| English ivy | *Hedera helix* | 5 |
| Hall's Japanese honeysuckle | *Lonicera japonica* 'Halliana' | 4 |
| Trumpet honeysuckle | *Lonicera sempervirens* | 3 |
| Catclaw vine | *Macfadyena unguis-cati* | 8 |
| Moonseed | *Menispermum canadense* | 5 |
| Wirevine | *Muehlenbeckia complexa* | 6 |
| Virginia creeper | *Parthenocissus quinquefolia* | 3 |
| Japanese creeper (Boston Ivy) | *Parthenocissus tricuspidata* | 4 |
| Passion flowers | *Passiflora* species | 7-8 |
| Silver fleece vine | *Polygonum aubertii* | 4 |
| Chinese star-jasmine | *Trachelospermum jasminoides* | 7-8 |
| Glory vine grape | *Vitis coignetiae* | 5 |
| Japanese wisteria | *Wisteria floribunda* | 4 |
| Chinese wisteria | *Wisteria sinensis* | 5 |

Kudzu (*Pueraria lobata*), from Japan, was widely planted in the South in the early part of the 20th century, mainly for soil conservation and as a food source for cattle. It was also sometimes planted in gardens for ornament since the foliage is lush and attractive. Kudzu quickly escaped from cultivation, romping through Georgia and nearby states and smothering huge tracts of land. It became known as the vine that ate the South, and now hardly anyone plants it.

## Self-supporting by Rootlets, Holdfasts, or Tendrils with Discs

These vines will cling to anything, and it is from this list that one should select the vines for covering stone or brick work. Some grow more rampantly than others, some are evergreen and some are deciduous. None of them need be held to the building by man-made means of support.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Trumpet creeper | *Campsis radicans* | 4 |
| Blood-trumpet vine | *Distictis buccinatoria* | 10 |
| Wintercreeper | *Euonymus fortunei* | 5 |
| Glossy wintercreeper | *Euonymus fortunei* 'Carrierei' | 5 |
| | *Euonymus fortunei* 'Gracilis' | 5 |
| Baby wintercreeper | *Euonymus fortunei* 'Minima' | 5 |
| Common wintercreeper | *Euonymus fortunei* radicans | 5 |
| Creeping fig | *Ficus pumila* | 9 |
| English ivy | *Hedera helix* | 5 |
| Gold-leaf ivy | *Hedera helix* 'Aureo-variegata' | 5 |
| Baltic ivy | *Hedera helix* 'Baltica' | 5 |
| Bunch-leaf ivy | *Hedera helix* 'Conglomerata' | 5 |
| Finger-leaf ivy | *Hedera helix* 'Digitata' | 5 |
| Small-leaf ivy | *Hedera helix* 'Minima' | 5 |
| Climbing hydrangea | *Hydrangea anomala petiolaris* | 4 |
| Catclaw vine | *Macfadyena unguis-cati* | 8 |
| St. Paul Virginia creeper | *Parthenocissus quinquefolia* 'Saint-paulii' | 3 |
| Japanese creeper or Boston-ivy | *Parthenocissus tricuspidata* | 4 |
| Low's Japanese creeper | *Parthenocissus tricuspidata* 'Lowii' | 4 |
| Veitch's Japanese creeper | *Parthenocissus tricuspidata* 'Veitchii' | 4 |
| Tanglehead | *Pileostegia viburnoides* | 7 |
| Japanese hydrangea-vine | *Schizophragma hydrangeoides* | 5 |

George Taloumis

Dutchman's pipe *(Aristolochia durior)* covers a porch or trellis with sun-shading leaves after the unusual flowers have faded.

## Twining Vines

The following are selected for twining up a rainspout, a wire, or for use on lattice work or on chain-link fences. Once given a good start they will take care of themselves, but some of them may grow so vigorously that they will have to be headed back from time to time. If the fence abuts the sidewalk, the long runners of bittersweet vines, for instance, can become a hazard to pedestrians. In such a case a close-clinging vine such as the fleece vine or the Virginia creeper would be better.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Actinidias | *Actinidia* species | 4, 7 |
| Fiveleaf akebia | *Akebia quinata* | 4 |
| Dutchman's pipe | *Aristolochia durior* | 4 |
| Bittersweets | *Celastrus* species | 2, 4 |
| Carolina jessamine | *Gelsemium sempervirens* | 7 |
| Scarlet kadsura | *Kadsura japonica* | 7 |
| Honeysuckles | *Lonicera* species | 3-5 |
| Moonseed | *Menispermum canadense* | 5 |
| Wire vine | *Muehlenbeckia complexa* | 6 |
| Silk vines | *Periploca* species | 5, 6 |
| Silver fleece-vine | *Polygonum aubertii* | 4 |
| Chinese magnolia-vine | *Schisandra chinensis* | 4 |
| Himalayan magnolia-vine | *Schisandra propinqua* | 8 |
| Chinese star-jasmine | *Trachelospermum jasminoides* | 7-8 |
| Regel's threewingnut | *Tripterygium regelii* | 4 |
| Wisterias | *Wisteria* species | 4, 5 |

## Clinging by Means of Tendrils

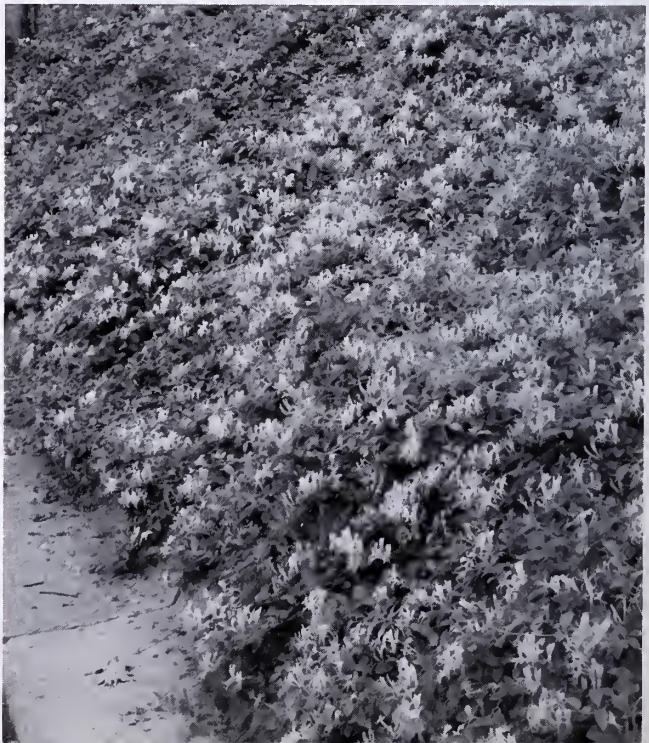
These too can be used on lattice work and on chain-link fences; but they are not too satisfactory on single-wire supports, for they need something horizontal around which they can fasten their tendrils. The grapes are so vigorous that they are grown on horizontal wires in vineyards, but the home gardener frequently finds that he must assist them a bit during the growing season in order to guide vigorously growing shoots.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Ampelopsis | *Ampelopsis* species | 4, 7 |
| Coralvine | *Antigonon leptopus* | 9 |
| Crossvine | *Bignonia capreolata* | 6 |
| Clematis | *Clematis* species (tendrils in the form of modified leaf stalks) | 4, 5, 6 |
| Cup-and-saucer vine | *Cobaea scandens* | 9 |
| Catclaw vine | *Macfadyena unguis-cati* | 8 |
| Silver vein creeper | *Parthenocissus henryana* | 8 |
| Virginia creeper | *Parthenocissus quinquefolia* | 3 |
| Engelmann Virginia creeper | *Parthenocissus quinquefolia* 'Engelmannii' | 3 |
| Passion flowers | *Passiflora* species | 7-8 |
| Silver fleece-vine | *Polygonum aubertii* (modified leaf stalks) | 4 |
| Summer grape | *Vitis aestivalis* | 4 |
| Glory vine grape | *Vitis coignetiae* | 5 |
| Doan grape | *Vitis doaniana* | 6 |
| Fox grape | *Vitis labrusca* | 5 |
| Riverbank grape | *Vitis riparia* | 2 |
| European grape | *Vitis vinifera* | 6 |
| Frost grape | *Vitis vulpina* | 5 |

## For Banks

Occasionally there are banks too steep for grass to be grown properly, and possibly too difficult or not important enough to plant with special ground covers. The vines in this list are the ones that can be expected to ramble over such banks, covering the soil and any rocks or holes that are present. As is stated in the accompanying articles, *Akebia quinata* and Hall's honeysuckle are so vigorous that they can get out of control and become serious pests, while *Euonymus obovata* is much slower in growth and is easily restrained. Usually English ivy is easily controlled, certainly in the North, but in the South it can become a rampant spreader. So, select from among the plants in this list with care, realizing in advance that it would probably be best to plant slow-spreading ground covers on the short bank and reserve the vines in this list for the very steep bank or the bank with poor sandy soil or the bank where anything is desirable that will cover the ground. It should also be pointed out that the memorial rose and Hall's honeysuckle are both excellent for their habit of rooting along their stems where they may touch moist soil, and so these aid materially in preventing soil erosion.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Akebia | *Akebia* species | 4 |
| October clematis | *Clematis apiifolia* | 4 |
| Sweet autumn clematis | *Clematis dioscoreifolia robusta (paniculata)* | 5 |
| Travelers' joy | *Clematis vitalba* | 4 |
| Italian clematis | *Clematis viticella* | 5 |
| Big-leaf wintercreeper | *Euonymus fortunei vegeta* | 5 |
| Running euonymus | *Euonymus obovata* | 3 |
| English ivy | *Hedera helix* | 5 |
| Hall's Japanese honeysuckle | *Lonicera japonica* 'Halliana' | 4 |
| Moonseed | *Menispermum canadense* | 5 |
| Virginia creeper | *Parthenocissus quinquefolia* | 3 |
| Rambler rose, Memorial rose | *Rosa wichuraiana* | 5 |
| Grapes | *Vitis* species | 2-6 |



J. Horace McFarland

Hall's honeysuckle gives low, dense cover with profuse, fragrant blooms. It is invasive in the South but has a role in northern and California gardens provided it can be contained.

## Ground Covers

Several vines can be used as ground covers. Most of them are not neat in doing this and will quickly climb any shrub or tree near by. Although this may not be harmful, there are some situations where it is not desirable. Some, like *Vinca minor* and *Hedera helix,* will require little attention, and others, like the bittersweets, may quickly grow out of bounds and require a considerable amount of care to keep restrained. Therefore, vines as ground covers should be selected only after careful study of the situation.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Fiveleaf akebia | *Akebia quinata* | 4 |
| Pepper-vine | *Ampelopsis arborea* | 7 |
| Bittersweets | *Celastrus* species | 2, 4 |
| Wintercreepers | *Euonymus fortunei* vars. | 5 |
| Running euonymus | *Euonymus obovata* | 3 |
| English ivy | *Hedera helix* vars. | 5 |
| Henry honeysuckle | *Lonicera henryi* | 4 |
| Hall's Japanese honeysuckle | *Lonicera japonica* 'Halliana' | 4 |
| Moonseed | *Menispermum canadense* | 5 |
| Wire vine | *Muehlenbeckia complexa* | 6 |
| Silver vein creeper | *Parthenocissus henryana* | 8 |
| Virginia creeper | *Parthenocissus quinquefolia* | 3 |
| Engelmann Virginia creeper | *Parthenocissus quinquefolia* 'Engelmannii' | 3 |
| St. Paul Virginia creeper | *Parthenocissus quinquefolia* 'Saint-paulii' | 3 |
| Kudzu vine | *Pueraria lobata* | 6 |
| Memorial rose | *Rosa wichuraiana* | 5 |
| Big periwinkle | *Vinca major* | 7 |
| Common periwinkle | *Vinca minor* | 4 |

## Withstanding Moist to Wet Soil

The wetter the soil, the more difficult it is to find plants that will grow. These are among the vines to be considered for a moist situation. If they do not grow well, there are probably none that will.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Trumpet creeper | *Campsis radicans* | 4 |
| Virgin's bower | *Clematis virginiana* | 4 |
| Moonseed | *Menispermum canadense* | 5 |
| Chinese star-jasmine | *Trachelospermum jasminoides* | 7-8 |

Sweet autumn clematis cascades with feathery flowers just when the trees are turning color. A robust grower with lustrous, semi-evergreen foliage, it sometimes escapes from gardens.

## Withstanding Dry Soil

When the soil is very dry, there are only a few plants that will grow in it. When dry soil conditions are a problem, everything possible should be done to mix humus materials with the soil and to mulch the plants as well, in order that every bit of moisture be conserved. These are the vines that should be considered for such trying situations.

| Common Name | Scientific Name | Hardiness Zone |
|---|---|---|
| Pepper-vine | *Ampelopsis arborea* | 7 |
| Trumpet creeper | *Campsis radicans* | 4 |
| October clematis | *Clematis apiifolia* | 4 |
| Scarlet clematis | *Clematis texensis* | 5 |
| Virgin's bower | *Clematis virginiana* | 4 |
| Creeping fig | *Ficus pumila* | 9 |
| Trumpet honeysuckle | *Lonicera sempervirens* | 3 |
| Virginia creeper | *Parthenocissus quinquefolia* | 3 |
| Japanese creeper | *Parthenocissus tricuspidata* | 4 |
| Silver fleece vine | *Polygonum aubertii* | 4 |

## Withstanding Shade

| | | |
|---|---|---|
| Actinidias | *Actinidia* species | 4, 7 |
| Fiveleaf akebia | *Akebia quinata* | 4 |
| Dutchman's pipe | *Aristolochia durior* | 4 |
| Clematis | *Clematis* species | 4, 5, 6 |
| Wintercreepers | *Euonymus fortunei* vars. | 5 |
| Running euonymus | *Euonymus obovata* | 3 |
| Carolina jessamine | *Gelsemium sempervirens* | 7 |
| English ivy | *Hedera helix* vars. | 5 |
| Climbing hydrangea | *Hydrangea anomala petiolaris* | 4 |
| Honeysuckles | *Lonicera* species | 4-6 |
| Moonseed | *Menispermum canadense* | 5 |
| | *Parthenocissus* species | 3, 4, 8 |
| Tanglehead | *Pileostegia viburnoides* | 7 |
| Japanese hydrangea-vine | *Schizophragma hydrangeoides* | 5 |
| Bengal clockvine | *Thunbergia grandiflora* | 8 |
| Chinese star-jasmine | *Trachelospermum jasminoides* | 7-8 |
| Grapes | *Vitis* species | 2-6 |

## Annual Vines

Annual vines have many uses in the garden. A few are treated as annuals in the North, but are more-or-less perennial in the deep South and in the Tropics. These are marked with an asterisk (*) in the following list:

| | |
|---|---|
| *Cup-and-saucer vine | *Cobaea scandens* |
| Gourds | *Cucurbita, Lagenaria, Luffa* |
| Hyacinth-bean | *Dolichos lablab* |
| Hop vine | *Humulus japonicus* |
| Moonflower | *Ipomoea alba* |
| Scarlet starglory | *Ipomoea coccinea* |
| Cardinal-climber | *Ipomoea multifida* |
| Cypress vine | *Ipomoea quamoclit* |
| Morning-glories | *Ipomoea tricolor* |
| Sweet pea | *Lathyrus odoratus* |
| *Balsam-apple | *Momordica balsamina* |
| *Balsam-pear | *Momordica charanita* |
| *Clock vine | *Thunbergia alata* |
| Nasturtium | *Tropaeolum majus* |
| Canary-bird vine | *Tropaeolum peregrinum* |

# CARE OF ORNAMENTAL VINES

## Given proper planting and training, vines can be an asset in any garden

Donald Wyman

It is of the utmost importance that the right kind of vine be selected for the right place. Vines are vigorous growers—they can easily outstrip all other woody plants in the length they grow each year. Some, like the kudzu vine (*Pueraria lobata*), can grow 30 to 50 feet in a single year! As a result, they can quickly cover wall or trellis space, but they can grow out of control just as quickly and create a great deal of extra work to keep them within the proper limits. So, a twining vine for a rainspout or trellis, a clinging vine for a stone wall or trellis, an evergreen clinging vine for the chimney, and a fruiting vine where it will show off to best advantage—all these are possibilities, but each situation should be given careful thought before the vine is finally selected.

Most vines can be expected to grow best in good garden soils. In the case of wisterias (as is explained on page 65) too good a soil may result in over-vigorous vegetative growth and no flowers. For most of the vines grown for their foliage, this is not a special problem. Clematises are a bit difficult to grow well and present problems of their own, while the problems of growing rambler roses are sufficiently well known so that they need not be dealt with here.

Usually all vines will respond to a moderate amount of fertilizer by increased growth. However, they have individual methods of climbing and attaching themselves to supports. If one has a brick wall 20 feet high and 20 feet long, one plant of Boston-ivy could probably cover the wall eventually, but three or four vines spaced 5 feet apart would do the job much more quickly. Sometimes it is desired to have a trellis completely covered with vines to screen the viewer and to give shade. In such cases, vigorous-growing, large-leaved vines might be in order. It should be remem-

Climbing rose 'Mary Wallace' encircles a Cape Cod porch.

George Taloumis

J. Horace McFarland

Boston ivy *(Parthenocissus tricuspidata)* quickly covers a house or wall. As with most vines, some trimming may be necessary to keep it within bounds.

bered in this connection that not all vines grow as high or as dense as some. English ivy where it proves winter hardy, may grow to the top of the tallest tree yet not have the screening value of the larger-leaved Dutchman's pipe.

Training young vines need not be difficult. Once the purpose for which they have been selected has been decided, then comes the matter of training them to cover the trellis or wall properly. If they are to be tied to some support, the binding should not be too tight, otherwise it might strangle the plant. Vigorous pruning frequently results in increased elongation of the stems remaining, but it should be remembered that all in all the plant that is heavily pruned actually produces less leaf surface in the end.

It has been observed that sometimes a vine that is trained horizontally will produce more flowers than one growing vertically, although this may not always be the case. Pruning of any kind might best be done in the early spring except on certain of the vines such as some kinds of clematis and the wisterias, which are grown chiefly for their spring flowers.

A vigorous, tall-growing vine will frequently produce a major part of its leaves at the ends of the shoots, i.e., considerably above the ground, thus leaving the basal portion bare of leaves. In this case, a runner should be bent downward and around the bare portion of the plant. If the vine is growing more than is desired, pruning the roots may reduce the over-all growth quickly.

### Clinging vines

Some of the clinging vines are very easy to start. Boston-ivy, for instance, quickly grows up a wall, fastening its small root-like holdfasts tenaciously to anything with which it comes in contact; and these hold the vine securely during the rest of its life. Some, such as the climbing hydrangea, are often difficult to start. This

George Taloumis

A young Japanese wisteria blooms after the broadleaf evergreens for continuing color at the front door.

vine takes a year or so before it really begins to grow well. During that time the growth is slow and the small roots are not always able to hold the vine firmly to the wall. In this case, some support or system of tight wires should be used to hold the young shoots firmly against the wall; then it will not be long before the plant will be self-holding. An old climbing hydrangea on the three-story brick administration building at the Arnold Arboretum, once it was properly started, has never needed wires or any other means to hold it to the building in the forty-five years it has been growing there.

Some vines grow considerably faster than others, and this fact also should be taken into consideration when a variety is first being selected. Virginia creeper, for instance, will grow twice as fast as English ivy. Consequently, if only a very small area is to be covered by a clinging vine, like the side of a chimney on a shingle house, the English ivy might be the plant to select; although it would take a longer time for it to cover the chimney, it would not require the constant pruning and cutting back afterwards to keep it from spreading over the shingles on the remainder of the house. Boston-ivy is another vine which is excellent for clinging to stonework but should be used carefully on houses where it can get between shingles. This vine grows very vigorously, at least 6 to 10 feet each year, and must be cut back rigorously at least twice a year to restrain it from covering the house. It is far better to plant a slower-growing vine under such circumstances, especially on small areas, and so save a great deal of pruning later on.

Sometimes it becomes necessary to remove an old, established clinging vine from a wall, and many stems are broken or injured and cannot be replaced. In this case, especially if the vine is a vigorously growing one, it would be better to cut the vine down to the ground and let it start up again.

This pruning should be done in the very

early spring, not in the late summer or early fall. If work on the wall is to be done in the summer or fall, cut the vine down late in the spring and let it grow as it will along the ground until after the work on the wall is done. Then most of the young shoots can be attached to the wall. The difficulty in cutting down an old vine in the summer or early fall is that the new growth might not have a sufficient time to harden off before winter; it might be seriously injured, if not completely killed back, by that first winter.

### Twining Vines

It is the twiners that really create problems. Most of these are vigorous growers and unless carefully watched they will grow out of line and attach themselves to any means of support within reach. In training them one should know, first of all, that they climb by twining in two different ways. Some climb by twining from left to right, as do the members of the following genera: *Actinidia, Akebia,* Dutchman's pipe (*Aristolochia*), bittersweet (*Celastrus*), moonseed (*Menispermum*), silk vine (*Periploca*), some of the native *Wisteria* species and Chinese wisteria (*W. sinensis*). Others, such as some of the species of honeysuckle (*Lonicera*), Chinese magnolia-vine (*Schisandra chinensis*), and Japanese wisteria (*W. floribunda*), climb by twining from right to left. By winding young runners around their supports in the right direction, one can shorten the time it takes them to become properly established.

Of course the trellis is the first place one has in mind for twining vines. Many types of trellises are available and such vines as Dutchman's pipe and honeysuckle are old-fashioned favorites long selected for this purpose. Trees are the poorest kind of support that can be used. Usually the tree trunk is too wide for a young twining vine to make a complete turn. The smallest wire is far more suitable. Bittersweet, akebia, wisteria, and bower actinidia are all vigorous twiners. The uninitiated gardener might think it would be a good idea to have a graceful vine high up in the branches of some tree—and it might, but not a twiner. Such a vine can quickly strangle branches and trunks by completely encircling them, and so cause considerable damage to the tree.

There are times when a twining vine is wanted on the side of a house. This is certainly understandable for there is nothing quite as beautiful in the fall and early winter as a narrow column of fruiting bittersweet. Such a column can be grown by stretching a sturdy wire perpendicularly up the side of the house, preferably so attached that it is held several inches away from the wall. Bittersweet will quickly twine its way up such a support, especially if there are several horizontal "holds" for the vine, spaced 6 to 8 feet apart; once it grows up to these, it will twine itself around in such a way that it will not slide back to the base if heavy snow or ice places much weight on it in the winter. This type of support, too, is perfect for the shingle or clapboard house; when repainting time comes the entire wire need merely be removed and laid on the ground while the painting is being done. Later it can be replaced so that the length of the vine need not be shortened one bit by the painting operation. It is not too difficult to keep the vine restrained once it has reached the complete height desired, but it is important that it be not allowed to grow indiscriminately around the gutters and shingles. In so doing it can cause a real hazard by undermining the shingles; and it can produce a fire hazard by plugging up the gutters in such a way as to cause the collection of leaves there in the fall.

Wisteria is more difficult to handle; the vine usually has to grow several years before flowers are produced and cutting it to the ground every so often would keep it from producing flowers almost indefinitely.

Most vines are interesting to grow and reward the gardener surprisingly well for a little care. There are many places in every garden where vines can be grown to good advantage. If allowed to grow uncared for they can quickly become pests; but a little intelligent care at the right time, to keep them properly restrained, will make them real assets in any landscape or foundation planting.

*Akebia quinata*

# VINES ON WALLS

## Which vines to use; how to plant and care for them

Lyle L. Blundell

Clinging vines furnish their own trellises. All that is needed is a vertical surface; they will make themselves very much at home on tree trunks or on walls, whether masonry or wood. Here a precaution is in order. Vines crossing a shingled facade may add much to the picture, but when they are permitted to remain too long on wooden structures, especially in wet climates, the retention of moisture about the aerial roots makes preservation of wood difficult. It is safer to restrict clinging vines to brick or stone masonry, stucco, chimneys or rock walls.

### Planting

Planting of these vines against a building wall is many times unrewarding and disappointing for several years. This is because soil at the bases of walls is generally the poorest encountered on a property. All manner of construction debris, with little or no good growing soil, is likely to be dumped back against the foundation as backfill; not until the roots have extended beyond this debris into the better soil well away from the foundation does the vine show any appreciable indication of covering the space provided for it. Thorough preparation of the soil is more important at the bases of walls on which vines are to be grown than anywhere else in the garden, because of the large leaf surface which it will be called on to nourish. When poor soil conditions are found, all soil and debris should be removed from a much larger hole than seems warranted by the root system planted. A hole 2 feet deep and 3 feet wide, extending to the undisturbed soil

*Both photos, George Taloumis*

Euonymus, trained up the pedestal and trimmed to maintain the underlying form. At right, a Japanese lantern complemented by English ivy.

beyond the foundation excavation, is not too large. Backfill this planting area with good loam into which has been incorporated well-rotted manure to one-fourth of its volume. If manure is lacking, leaf mold or compost fortified with commercial fertilizer will suffice. If the soil is unduly heavy, sand should be incorporated to make it more friable. In such a soil the vine will quickly make the anticipated cover.

### Training

No clinging vines, when well established and vigorous, are particular as to the surface over which they travel; therefore a severe pruning program will have to be carried on to keep them from wooden walls, windows and cornices, or otherwise held within bounds. Fortunately few of them are hurt by severe pruning.

Another means of growing vines against walls—one that maintains more automatic control of the area of coverage—is to place an iron pipe trellis or a wire or two against the wall (see page 58); on this support a twining vine such as bittersweet, honeysuckle or wisteria may be grown. For a low wall or a wooden house, a wooden trellis can be used. I recall one very effective garden retaining wall treatment. The wall was covered with common wintercreeper for winter richness; outside of this, about a foot from the wall surface, was an open wooden trellis which carried climbing roses for summer floral display.

Some vines are planted essentially for the beauty of their foliage. This is especially true of wall vines. The beauty and character of the plant is largely governed by the richness and texture of the foliage. The side of a large building can very adequately take a large, fast-growing, coarse vine, whereas a small garden requires a richer, finer-textured plant.

### Euonymus

Evergreen vines have the richest foliage and generally are the most refined in growth and appearance; wintercreeper *(Euonymus fortunei)* and English ivy

*(Hedera helix)* can surpass many deciduous vines in wall coverage. (For comments on English ivy, see pp.14, 77). Evergreen vines are broad-leaf plants and in the North are frequently subject to late winter foliage burn caused by excessive loss of water from the leaves when the ground is frozen and moisture cannot be replaced. This burning can be reduced to the minimum if evergreens are restricted to north and east exposures. Never plant an evergreen vine on a southwest exposure, where the burning is most severe because of the drying afternoon sun.

The smallest and most refined of the evergreen climbers is the baby wintercreeper *(Euonymus fortunei* 'Minima'). This miniature variation of the wintercreeper, with leaves the size of one's little fingernail, seldom grows over 3 feet high, and actually does not cling but will grow erect against a wall, tree trunk, or garden ornament. This is a choice miniature for an intimate spot on a low wall. It is one vine that rarely needs pruning.

The common wintercreeper *(Euonymus fortunei radicans)* is more robust, but may take many years to reach 10 or 15 feet high. It clings by rootlets, so crevices in the wall help its anchorage. The leaves are an inch long, oval, deep green, some of them more or less streaked with white.

Grown in deep shade, this plant will probably change very little in form in many years, but when given a freer growing location, within a few years the plant changes in character. Large branches grow horizontally from the wall; the leaves become larger and glossier, the buds are larger, and small green flowers and tan and orange fruits are produced in clusters on these branches. This mature form is known to the gardener as the glossy wintercreeper *(Euonymus fortunei* 'Carrierei'). The over-zealous growth extending from a building wall may catch high winds and the whole vine may be pulled to the ground. The horizontal branches can be cut back to half their length, thereby reducing the wind leverage, and the whole surface of the plants can be made neater by this shearing. A wire stretched along the wall will give added support.

Similar to the glossy wintercreeper, but with slightly larger, round, and less shiny leaves (about the size of a half-dollar), is the big-leaf wintercreeper *(Euonymus fortunei vegeta).* The flowers are produced freely and are small and greenish; the fruits which follow, dangling clusters of orange berries in creamy husks, remain throughout the winter. From the appearance of these fruits the plant is often called the evergreen bittersweet. While these two fruiting forms of wintercreeper are usually propagated by cuttings, the seeds can be planted and will produce the juvenile, or nonfruiting, forms. The seedlings of the big-leaf wintercreeper are round-leaved, small and a very soft dark green. This variation seems to have been overlooked, as I have never seen a name assigned to it. I recommend these big-leaf seedlings for a rich vine or ground cover.

One other important variety, the purple-leaf wintercreeper *(Euonymus fortunei* 'Colorata'), seems not to develop rootlets. I have only once seen it take to a wall enthusiastically, and this was with the aid of the gutter downspout.

All wintercreepers are attacked by a serious insect pest known as the euonymus scale. This insect makes more than one brood a year—the hotter the weather the greater the number of broods—so that a small infestation can spread rapidly in the course of a year. Control is difficult when the insect is well established. (See page 60.)

### Deciduous Vines

Deciduous clinging vines have compensating characters which make up for their lack of foliage in winter. The blaze of color on the creepers in the fall makes this season their most outstanding, and

*Both photos, George Taloumis*

Above, climbing hydrangea (*H. anomala petiolaris*) in bloom on north side of house; below, woodbine or Virginia creeper (*Parthenocissus quinquefolia*) cascades down a seashore foundation.

the flowers on the climbing hydrangeas add to their spring attractiveness.

The smallest-textured plant among deciduous vines is Low's Japanese creeper (*Parthenocissus tricuspidata* 'Lowii'). Used on low walls or at an entrance, it decorates without dominating. The leaves are only about an inch across, several pointed, and curled; they have short stalks so that the growth stays close to the wall. The holdfasts are not so well developed as those of *P. tricuspidata*. This vine produces no fruit but its fall color is a brilliant red.

Japanese creeper (*Parthenocissus tricuspidata*), also called Boston-ivy, although it is a native of Japan and China, is the most generally useful of all clinging vines. It attaches itself to the wall at first by "sticky fingers"—branched tendrils with enlarged disks at the ends of the branches; as it grows, the larger stems develop aerial roots which hold more firmly. The leaf somewhat resembles that of English ivy and here, as in English ivy, there are two plants in one. As the new growth starts out from the root, spreading in all directions, the leaves are small (less than an inch across), and sometimes purple and divided into three parts when young. As the plant develops, the leaves become larger; along the older stems the flower spurs develop—leaves here may be 4 to 8 inches across on stems a foot long.

The young, or juvenile, stage of the plant, with small leaves, has given rise to a variety named Veitch's Japanese creeper (*Parthenocissus tricuspidata* 'Veitchii'). If one wishes to keep this character, the vine can be pulled from the wall periodically, so that it will send out its new delicate tracery across the face of the wall. But when given free rein, this vine is a vigorous wall covering and has no concern for windows in its path. It is not particular about soil, and is most useful in covering large blank walls as it becomes larger in scale with its own maturity. The bees find that this plant furnishes a great supply of midsummer nectar from its greenish flowers, and the clumps of blue berries that follow add to the picture in the fall after the gorgeous scarlet leaves

Low's Boston-ivy has rosette-like leaves about an inch across. It is attractive in containers and small gardens, or as tracery along a stucco wall.

drop. The berries are persistent; and for those of us in the North another interesting picture is produced as the wet snow clings to the fruit spurs in an interesting pattern of blue and white against a wall.

The native Virginia creeper *(Parthenocissus quinquefolia),* sometimes also known locally as woodbine, is not so successful as a wall vine. It is even bolder in its foliage effect, but neither the disks that stick the plant to the wall nor the aerial roots are so well developed as in the Japanese creeper. Certain varieties, particularly 'Saint-paulii', are said to cling more closely, but the best recommendation for these vines is to have a very rough surfaced wall or wires attached for support. Otherwise the plant will come plunging down in a year or two.

The leaves of Virginia creeper are five-parted and vary in size from a few inches across near the end of the stem to more than a foot across along the older stems. The shoots tend to grow vertically, spreading less broadly than those of the Japanese creeper; so for a complete cover, plants must be planted more closely. The various shades of red make the plant one of the most brilliant in the fall landscape. The blue berries, the size of a small pea, are borne in open clusters and either fall before winter or are eaten by the birds after the leaves drop.

Another "almost holding" vine is the trumpet creeper *(Campsis radicans).* This vine clings with the aid of a few rootlets at each joint; and unless given the aid of a gutter downspout or a chance crevice, it will be pulled down by the wind, which whips the large free-growing branches. Although usually used as a trellis vine, I have seen it attach itself, climb a two-story house, go up the roof, and seem to look for further heights after reaching the top of the chimney. The foliage is not very rich, being similar in appearance to ash leaves. The gorgeous orange or red trumpet-shaped flowers, 3 inches long in terminal clusters, are the great triumph of this vine, and the rather thick cigar-like fruit pods on the bright tan stems add to its winter interest.

The coarsest of all self-attaching vines are two related plants, the climbing hydrangea *(Hydrangea anomala petiolaris)* and the Japanese hydrangea-vine *(Schizophragma hydrangeoides).* These plants are so coarse that they are satisfactory only on the largest and coarsest of stone work, where they are happily in scale. Both of these vines cling by rootlets and thrust out from the wall branches 1 to 3 feet long, on which the leaves and flowers are borne.

Opinions differ as to which of these vines is to be preferred, most authorities recommending the climbing hydrangea. My own preference is for Japanese hydrangea-vine; I like its sharply saw-toothed, smaller leaves, as well as its shorter branches and habit of remaining closer to the wall.

# VINES ON BUILDINGS
## And methods of attaching them

Milton Baron

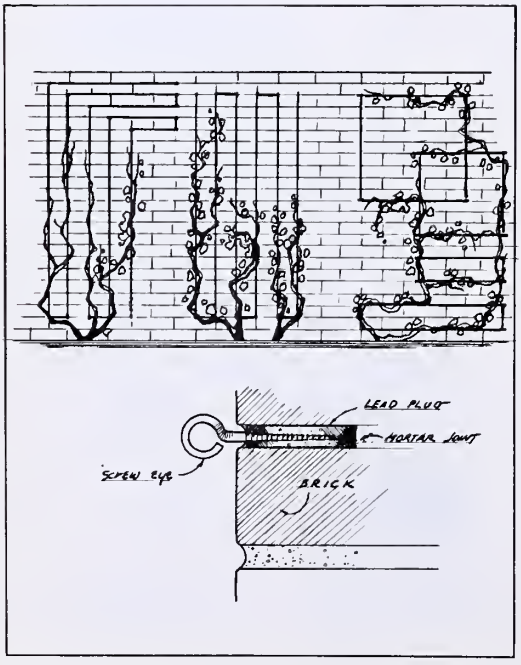
In planning the use of vines on buildings, esthetic aims must be balanced against practical considerations. Vines, like other plant materials, used astutely, enhance the architecture by interesting line, foliage pattern, and in certain cases, flowers. Poor features of the building's exterior may be hidden and the harshness of large areas of brick or masonry be relieved. When there is little room for trees or shrubs, as is frequently the case in our cities, vines can be used on buildings even if there is only so much as a square foot of soil for planting. The arrangement of planting pockets must be decided upon prior to laying concrete or asphalt surfaces. Besides growing in restricted areas, many vines tolerate adverse conditions such as the deep shade of north exposures, city atmosphere, and low soil fertility. Years ago it was thought most climbers were slow in starting. This has been disproved by giving reasonable care to vines planted in pockets of well prepared, enriched soil. Certain species will grow six or more feet the first year, far exceeding the increment of other woody materials for the same period.

As a result of this rapid growth, certain vines may become too large for their location or too heavy for their supports. Occasional vigorous pruning may be necessary to keep growth within proper bounds. When too many vines are planted, or if allowed to grow without restrictive pruning, even window screens will be covered by a heavy matting of green. No control except pruning in the early summer seems to check this. Reduction of the vine mass also cuts down on roosting places for birds.

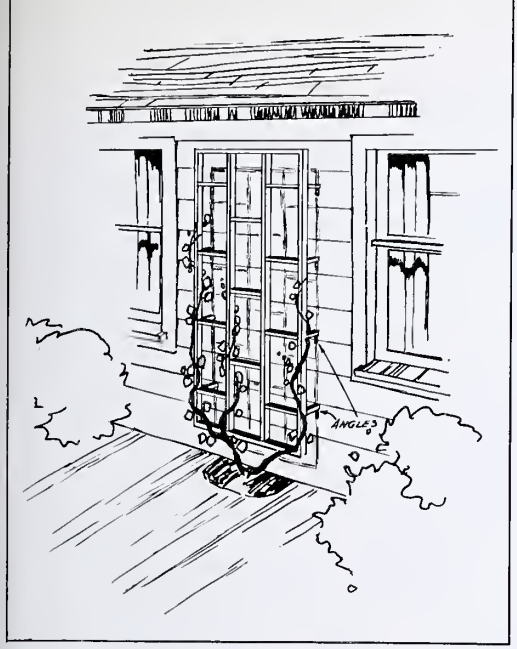
Fortunately, vines are easy to maintain. In general, they are subject to but few insects or diseases; as a group their care is no greater, and in many cases is less, than that of trees or shrubs. Should minimum upkeep be desired, proper selection of the species at the start is all-important.

Since vines climb in several ways, this charactertistic is most important. Vines which climb and adhere by means of rootlets or tendrils with discs (see page 44) support themselves as they grow and are perhaps the most practical to use. They should be used only on structures or walls of stone or masonry. If used on wood, they cannot be easily removed when

*All drawings, William J. Johnson*

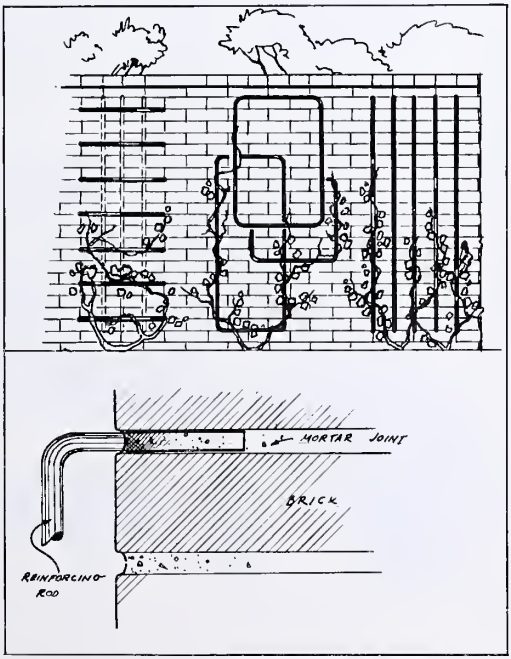



Vine supports of galvanized or braided wire fastened with hooks or screw eyes are not obvious to the observer.




Wooden vine supports are useful for displaying climbers up a clapboard house. They should be designed to harmonize with the architecture of the building. Attach with metal angles for easy maintenance.

painting is needed, and they have a tendency to damage the surface and wood itself. Wooden structures are best clothed by vines separated from the wall surfaces to allow air circulation and easy maintenance. To accomplish this the choice should be from the group which twines about a support or which climb by means of tendrils (see page 45). These must be provided with means of climbing support, otherwise they make an unsightly heap or trail aimlessly on the ground.




The most permanent kinds of vine supports are made of wrought iron or reinforcing rods. They form a definite pattern against the wall or building.

*How to combat the serious threat of . . .*

# EUONYMUS SCALE

About the only vine pests causing any serious difficulty in the northern and central part of the country are the scale insects, chiefly attacking *Euonymus* and sometimes the bittersweets. Euonymus scale especially causes much injury over widespread areas. This pest was introduced into America from the Orient prior to 1880 when it was first discovered in this country at Norfolk, Virginia. Since that time it has spread widely both in the United States and Canada, although it must be admitted that at present the pest seems to be more difficult in the eastern and northeastern parts of the country than it is elsewhere.

### Life History

Euonymus scale not only infests species of *Euonymus* but sometimes is found on the varieties of the common lilac, bittersweet, pachysandra and English ivy *(Hedera)*. The treatment or control is the same in each case. Most of the small white scales that are seen are the males, which are very small and narrow, while the females are larger, wider and light brown, and consequently not so easily seen at the first glance.

When the crawlers first emerge from the egg in the spring they move around on the plant for 12 to 36 hours, and then they settle and remain in one spot. They may crawl anywhere from ⅛ inch to 16 inches during that period. It takes about 46 days for the scale to mature, and in the vicinity of Massachusetts there are two generations a year. They spend the winter either as a mature or immature fertilized female. Their life history is definitely dependent on the weather, for in one year with a cool late spring, crawlers were not noticed near Boston until June 15th while in another section with warmer weather they appeared June 1st. It is essential to keep this in mind when determining the time to spray.

### Control

No half measures will control euonymus scale; it can seriously injure and actually kill well-established vines if allowed to go unchecked. Sometimes it may be necessary to cut the vines to the ground, spray the remaining stubs thoroughly and so start the plant all over again, in order to control the pest properly.

In late March or early April, apply "Superior"-type dormant spray, 60- or 70-sec. oil with or without ethion. Follow manufacturer's directions. To control crawlers, spray in early to midspring with carbaryl (Sevin) or a multipurpose spray containing malathion and methoxychlor. The number of applications for crawlers depends on the amount of infestation and the weather. Applications should be made ten to fourteen days apart in two or three applications. A well-grown, scale-free planting of *Euonymus* is very much worth a little attention now and then.

Left: female scale insect; center, male; right, infested euonymus branch showing more males (white) than females. Dotted areas on leaves represent normal green; white areas the yellowing effect of infestation.

Eva Melady

# VINES WITH SEXES SEPARATE

## Male plants never fruit; female plants fruit if males are sufficiently near

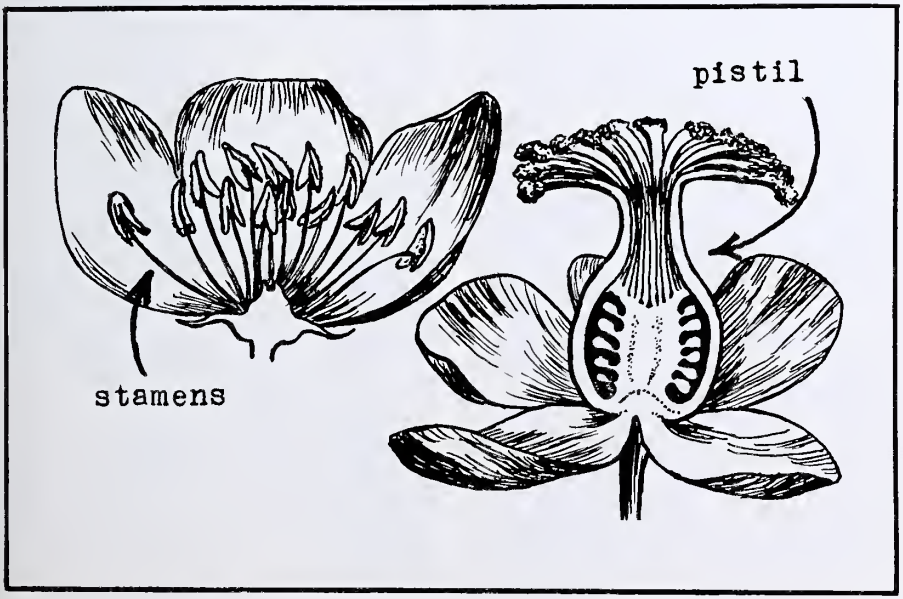
Donald Wyman

There are at least five kinds of vines with sexes separate—that is, with the pollen-bearing (male) flowers on one plant and the pistil-bearing (female) flowers on another plant. It is only these pistillate flowers that develop into fruits, and usually they do so only if a male plant is in the near vicinity to supply the pollen. The five genera of vines in this group are *Actinidia, Celastrus* (bittersweet), *Schisandra, Smilax* (cat brier) and, occasionally, *Vitis* (grape).

From the standpoint of ornament, the bittersweets are the most important of all; because of their bright orange fruits they are among the most popular of all fruiting vines. Many people have been disappointed because carefully grown bittersweet vines, in a prominent garden spot, have never borne fruits over the years. This has been either because a male (or staminate-flowering) vine was planted—which will never have fruits under any circumstances; or because a pistillate (or potentially fruiting) vine has been planted, with no near-by source of pollen from male plants to fertilize the pistillate flowers when they are in bloom.

We have experimented with bagging these flowers when they bloom and we know that in the case of bittersweet at least, pollen is necessary for fruiting. Experiments at the Arnold Arboretum have shown that pollen from male plants is carried by the wind or by insects nearly a quarter of a mile, though how much farther we do not know. There are three possibilities available to the homeowner to insure the fruiting of his bittersweet vine, provided of course, he has bought a

Flowers of actinidia: left, male; right, female. (Gundersen, *Families of Dicotyledons*, copyright 1950 Chronica Botanica Co.)



vine that either has fruit on it or is guaranteed to be a fruiting plant.

1. A small male plant can be planted in the same hole with the fruiting plant. This will have to be kept restrained somewhat, over the years, so that it does not grow more vigorously than the fruiting plant.

2. When the vine begins to flower, a bunch of branches with pollen-bearing flowers can be collected from the wild or from a known male plant, placed in a bottle of water, and hung up high in the pistillate vine. Wind and insects will do the rest, but the flowers should be in good condition for several days at least. I have done this very successfully, but the trick is to obtain the right flowers at just the right time. They usually bloom about June 10 in the vicinity of Boston.

3. The best way of all for gardeners with talent for experimentation is to bud graft a few buds from a staminate plant on the fruiting plant. This this easily done, with a little practice, after reading about budding in any well illustrated book on plant propagation (see BBG *Handbook on Propagation, pp. 25-28;* it should be done in August. Of course the branches that develop from such buds should be clearly marked so that they will not be pruned off. It may well be that scions could be grafted on the fruiting plant in the early spring instead, but the budding is simple and easily done.

The fruits of the bower actinidia (*A. arguta)* are not ornamental, hence are not desired unless one is interested in making preserves from them. If fruits are desired, the same possibilities are open as for bittersweet.

Magnolia-vine *(Schisandra)* has very attractive fruits (red, in pendulous clusters), but it is rarely used in this part of the country. The Chinese species, which is hardy here, bears its fruits well hidden by foliage, so that it is really not considered a desirable fruiting ornamental.

Smilax, because of its many thorns, is seldom planted as an ornamental.

Most of the grapes *(Vitis)*, especially the ones grown for their fruits, have both kinds of flowers on the same plant. A few of the species grown for ornament have sexes separate, but in these cases the fruits are not usually desirable.

It should be specifically noted that wisterias are definitely not in this group. They sometimes fail to flower and fruit for other reasons; but their flowers are perfect, and all wisteria vines should eventually bear the flowers to which we are accustomed.

# Poison-Ivy

This too is a vine but unlike most of the others, poison-ivy *(Rhus radicans)* is one we are always trying to eradicate. A vigorous grower, it will spread over anything and grow up the first upright object it reaches by attaching its small areial roots tenaciously to the means of support. Even at the seashore it grows within reach of salt water spray. Its autumn color is a rich orange and red. The compound leaves, made up of three parts, should be familiar to everyone, and its small white berries should also be just as well known. Unfortunately they are not! One winter, in a Boston suburb, some energetic garden club ladies included these "new berries we found in the woods" in some excellent Christmas wreaths, only to spend the vacation days uncomfortably realizing what it was they had used.

Chemical sprays can eradicate poison-ivy if used at the right time and according to manufacturer's directions. Use a non-selective herbicide with caution and discretion. Wet leaves thoroughly. Keep spray away from desirable plants. Ammonium sulfamate (Ammate) or Silvex, in areas of the country where it can be purchased, may also be used, but it must be remembered to keep this "brush killer" away from ornamental trees and shrubs in the garden. In the case of either spray, apply only on calm days, and be especially aware of runoff problems on slopes.

J. Horace McFarland

A rampant grower, poison-ivy can be a lush, attractive vine, especially in autumn when it turns a splendid red or yellow. Its most familiar look is that of the modest-sized leaves at bottom left. Bottom right shows leaves and fruits contrasted with Virginia creeper, another vine that often appears in the same range but is harmless.

George Taloumis

# FLOWERING IN WISTERIA

## Why wisteria may fail to flower and some pointers on what to do about it

Harold O. Perkins and Donald Wyman

Wisteria stands out from all the other vines as sometimes proving the most troublesome to bring into flower. Horticulturists receive many a query about vines that are ten to fourteen years old and have "never flowered." Some ask about the sexes of the plants, and others about where to buy plants guaranteed to flower. The answers to these questions are not as simple as they might be, but here are a few pointers about wisteria.

### Sex Separation Not a Factor

Each flower of wisteria is hermaphroditic (both sexes present in the same flower); there is no such thing as separate male and female wisteria vines (as there is, for example, in bittersweet). Moreover, this factor affects only fruit production, not blossoming, so in any event it would not affect the ability of wisteria to bloom. Given the right conditions, all wisterias should flower. Admittedly the fact is that some of them fail to do so for many years, if ever.

### Age of the Plant

In some cases all that may be necessary is to wait a few years; wisterias often take about seven years to reach a flowering

*George Taloumis*

With age wisteria forms a handsome, gnarled trunk that can attain the girth of a medium-sized tree. Because plants can live to a great age, it is a pity not to have flowers. For example, a century-old specimen near an entrance to Prospect Park in Brooklyn has probably never flowered despite lush vegetative growth.

Paul Frese

Young wisteria, trained up a trellis and properly cultivated, is a breathtaking late spring sight. Plants tolerate city conditions well and the foliage is attractive during the growing season.

stage. In one instance a Japanese and a Chinese wisteria grew side by side. The Chinese vine bloomed beautifully every year, according to the owner, but the Japanese vine had never bloomed. At the time they were observed the Chinese vine was covered with flowers and a short time later the Japanese vine also had a few flowers. The owner said this was the first time in fifteen years that it had bloomed, but it might have bloomed sparsely before, unnoticed.

### Over-fertilization

Heavy fertilizing, and especially an excess of nitrogen, results in heavy stem and leaf growth. This discourages flower bud formation. A plant which has an abundance of dark-colored, healthy foliage should, therefore, receive a no-nitrogen fertilizer, or no fertilizer at all.

Fertilizing with superphosphate is permissible and often desirable. A good way

**WISTERIA MAY NOT FLOWER BECAUSE:**

1) Plant is not old enough
2) Too rich soil (too much nitrogen) leads to excessive stem and leaf growth but no flowers
3) Winter cold (in northern areas) may kill flower buds
4) Root and top growth are out of balance
5) Insufficient sunlight

**TO HELP INDUCE FLOWERING:**

1) Wait a few years
2) Do not apply nitrogen fertilizers; apply superphosphate
3) Protect by taking down and covering in winter
4) Prune branches severely; root prune
5) Do not plant in shade

to do this is to dig a 2-foot trench about the base of the plant and mix a considerable amount of superphosphate with the soil as it returned to the trench.

### Root Pruning

Applying superphosphate as above described serves a dual purpose. It supplies the feeding roots with an excess of phosphoric acid which may hasten flowering, and in the same operation it accomplishes root pruning. The latter may also be carried out by forcing a sharp spade into the soil in a circle about 18 inches from the trunk, thus cutting all the side roots.

### Branch Pruning

If a plant shows excessive growth vigor, *i.e.*, rapid production of stems and leaves, the long shoots may be pruned back to two or three buds in the late spring. Repeat this pruning every other week until growth stops. This may help but is not a sure cure.

### Climate

In the colder areas of the United States and southern Canada severe winters can kill flower buds, so that no amount of pruning or proper fertilizing will help flower production. In such places the vines should be taken down for the winter and covered with hay, brush, or soil, as is commonly recommended for rambler roses.

There is some evidence that sunlight is essential for flowering, so do not plant wisteria in the shade.

### Purchasing Plants

Some commercial growers believe that certain clones are notably good flowering specimens and they always propagate from these. It is well to buy such plants, if available. Other nurseymen tie a knot in the young stem and claim that by so doing they make the vine certain to flower. Potted plants that have already flowered are sometimes available.

# Chinese vs. Japanese Wisteria

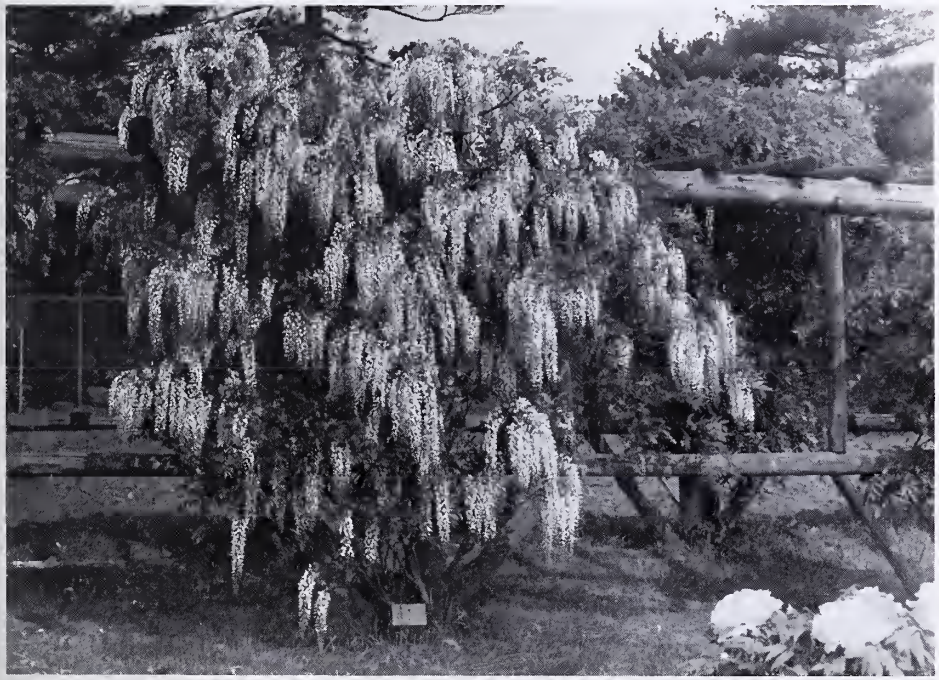
When wisteria is mentioned, most people think of the short-clustered Chinese wisteria *(W. sinensis)*, which is widely planted throughout the country, while only a few consider the hardier Japanese wisteria *(W. floribunda)*. Both have been in America about a century, but the Chinese plant has proved more popular. The flower clusters are about 7 to 14 inches long and all the flowers open simultaneously, making a beautiful display. The clusters of the Japanese vine may be 8 to 52 inches long (depending on the variety and the soil and moisture conditions where they are growing), and the individual flowers do not all open at once. Instead, the flowers begin to open at the base of the cluster and open progressively to the tip, so that usually not all the flowers in a cluster are in good condition at one time.

The Japanese vine makes up for this, however, in having some garden varieties (such as *W. floribunda* 'Macrobotrys') with clusters over 3 feet long. We have actually measured some at the Arnold Arboretum and found them to be 36 inches long. Then, too, the Japanese plant is hardier and has many varieties in the trade, one with pink flowers *(W. floribunda* 'rosea') and several with white flowers; still others have flowers varying slightly in size and color. The Japanese varieties can usually be distinguished from the Chinese in that they have thirteen to nineteen leaflets, while the Chinese has seven to thirteen leaflets.

Both types are splendid, vigorous-growing ornamental vines making wonderful displays when well grown. Selections should be made with the respective merits of each form clearly in mind.

George Taloumis

Above is Chinese, below is Japanese wisteria. The former's blooms appear simultaneously, the latter's in sequence down a raceme that can be over three feet long.



# ANNUAL CLIMBERS

## How to grow some of these useful and attractive vines

Alys Sutcliffe

Most people are familiar with morning-glories as annual vines that grow quickly and flower prolifically if grown in a sunny place. They are useful plants to cover an unsightly fence or a bare wall.

There are several other annual vines which may be used for this purpose. They are easy to grow, some more so than others, and they usually flower well if planted in a sunny position. Some prefer rich soil with plenty of fertilizer and water, but some actually grow better in poor soils. This means that anyone can grow one or two annual vines that will flower most of the summer and fall until frost.

The following list of these vines and their culture may be helpful to the new homeowner with a wire fence or garage wall that he would like to beautify until some perennial vines are established.

Canary-bird vine *(Tropaeolum peregrinum)* has attractively cut leaves and yellow flowers, and will grow well in shady places. Seed can be sown out-of-doors when the ground is warm.

Nasturtium *(Tropaeolum majus)*. The climbing varieties of the garden nasturtium will grow in full sun in any sandy or gravelly soil, preferring this to a rich, heavy mixture. They should be sown out-of-doors as soon as the ground warms up a bit. Black aphids will infest them unless they are sprayed regularly with nicotine sulphate or some equally effective trade-name spray; even soapy water helps to keep them free of these pests.

The morning-glory family includes several species that have well-known climbers among them, including the obnoxious bind-weeds *(Convolvulus arvensis and C. sepium)*. Do not plant these!

*J. Horace McFarland*

Cardinal climber, an illustration of the usefulness of annual vines for providing quick cover.

Turk's cap, one of the larger, showier annual gourds.

J. Horace McFarland

The following are worthwhile vines:

Cardinal-climber (*Ipomoea* x *multifida*) is a strong and rapid grower with bright red flowers and fern-like foliage. Sowing can be done out-of-doors about the beginning of May. The seed should first be soaked in water for a few hours.

Moonflower (*Ipomoea alba*), a night-blooming morning-glory, has large, white, sweet-scented flowers that open in the early evening and fade towards morning. Although it is perennial in the tropics, it is treated as an annual in the North. There is a pink variety, also.

There are several very good varieties of morning-glories *(Ipomoea)* including 'Giant Cornell' with large red flowers that have a white border; 'Pearly Gates' a white variety; and 'Darling', wine-red with a white throat. 'Scarlett O'Hara' and 'Heavenly Blue' are old favorites. Clarke's early-flowering variety of 'Heavenly Blue' might come into flower sooner than often happens with morning-glories. All make plenty of strong growth and cover a fence quickly, but do not flower until late summer. Once they begin, they go on until frost. This is all right if you are away most of the summer and come home to find plenty of color in your garden, but it is disappointing if you plant morning-glories in your summer garden and have them start to flower just as you are about to leave at the end of the season.

Purple-bell cobaea or the cup-and-saucer vine or cathedral bells *(Cobaea scandens)* is a rapid-growing vine with purple bell-shaped flowers. The seeds are flat and should be put into the ground edge-wise. In the South this is perennial.

Hop-vine *(Humulus japonicus)* will make a quick cover for a fence. The leaves are quite handsome. There is also a white-variegated form grown from seeds.

Gourds for ornament are popular because they can be used for winter decorations. Most of them will grow over any garden fence. They need good soil, plenty of water and well-balanced fertilizer. The seed may be sown as soon as all danger of frost is over. When the plants begin to grow, a mulch will help to keep the roots cool and moist. The fruits should not be picked until the shells are hard, then they should be cut off with as much stem as possible. Wash the gourds with a soft brush dipped in some phenol disinfectant such as Lysol or Sylpho-Naphthol and leave them to dry. In three or four days they may be waxed or varnished.

Sweet pea *(Lathyrus odoratus)*. We are always hopeful that these will be worth the trouble they take, but except in special situations and for unexplainable reasons, they seldom are. For those who can succeed with them, they are superb annual climbers. They lend color and fra-

grance to the garden and are fine for cutting. They need a deeply-trenched rich soil and cool weather. In the fall dig a trench about 18 inches deep, put 9 inches of well-rotted manure in the bottom, and over this put 6 inches of good soil into which a complete fertilizer has been mixed. Sow the seed in November and cover with about 2 inches of soil; then fill the trench in with a light mulch of leaves or evergreen branches which can be removed in the spring. Sweet peas need plenty of water and should be picked daily; once they go to seed the vines soon begin to turn yellow.

**General Tips on Culture**

To get an early start, morning-glories and other annual vines may be sown in pots indoors. It is preferable to use some of the treated pots now on the market; these can be put into the ground, plants and all, without disturbing the roots. Use a light, porous soil and soak the seeds before sowing. They should not be sown out-of-doors until the soil is warm. As soon as, or even before, the seeds start to grow, it is important to have something for the vines to climb on so that there is no chance of their getting bent and broken. This is often the cause of failure with annual vines and is easily remedied by putting twigs in the pots or around the plants until they reach the fence or lattice over which they will eventually climb.

# The Unusual Flowers and Fruits of *Akebia quinata*

This interesting twiner from central China, Korea, and Japan is one of the best of the foliage vines in the North. The flowers, appearing in midspring, are not conspicuous but are most interesting. The pistillate (female) flowers have three purple petals ½ to 1 inch in diameter, with several conspicuous pistils in the center. The staminate (male) flowers are much smaller, practically all stamens. Often the staminate and the pistillate flowers are borne in the same loose pendulous cluster, about 4 inches long. Wind and insects in this country do not seem to be very effective in pollination. In certain areas fruits may result without human aid, but to insure the set of fruit, hand pollination must be resorted to at just the right time.

When this is done properly, the fleshy pods will develop by fall. These are purple, about 3 inches long, and filled with a mucilaginous material and many black seeds. These thick pods are useless, but the plant and its method of fruiting offer an excellent opportunity to observe sex in flowers and to do hand pollinating with results.

*Roche*

Flowers of *Akebia quinata*—the large one is female, the small ones are male.

# VINES OF THE SOUTH

## Many varieties of fine climbing plants can be grown in warm climates

Roger B. Thompson

Vines seem to be more expressive of the tropical exuberance of nature than do trees, whose stature and incidence are everywhere within comparatively narrow limits. The farther one travels into the warmer and moister portions of our country, the more numerous are the vines one encounters, the more numerous the species, and the larger they become. The liana-choked tropics are no myth.

Vines in the North are, if not always docile, at least temperate and rather easily controlled. In more favorable circumstances of temperature, moisture, and length of growing season these same species sometimes graduate (or degenerate, depending upon one's interest in luxuriance or control) into predatory monsters, hydra-headed and menacing beyond belief; and all have relatives.

I have never been sympathetic with those who complain about the common and expected problems of maintenance; but when a man can go through a planting with a ditchbank blade (one of the most lethal weapons ever placed in the hands of man—a wide, 18-inch, hookbilled piece of steel extended by a 3-foot handle) and return a week later to find his labors all undone, one can appreciate his wish that certain vines, at least, did not grow quite so rapidly.

Vines as a class are singularly free from insect pests in the southern states, though with notable exceptions. Scale insects make any attempt to grow *Euonymus fortunei* and its varieties a constant war, often brought to desperate termination by a steel instrument or a concentration of oil spray "guaranteed to kill."

Wisteria in the North requires its pruning, but here in the South it grows interminably. I once saw an entire yard fenced with a single plant. The owner had trained it over an arch above his front walk, and thence along a single strand of wire across the tops of forked cypress posts; it encircled his property like a python. Another with a trunk as thick as my body hung upon a massive live oak, enveloping

George Taloumis

Carolina jessamine (*Gelsemium sempervirens*) is extremely fragrant and, with butter-yellow flowers, very decorative in cultivation.

J. Horace McFarland

Cypress vine *(Ipomoea quamoclit)* has tiny scarlet and, in cultivars, white flowers. Originally tropical, it has found the American South quite congenial, and has naturalized there.

it almost to the tips of its twigs—the only tree with enough vitality to withstand its competition.

Both the cypress vine *(Ipomoea quamoclit)* and the scarlet starglogy *(I. coccinea)*, annuals introduced from the tropics, have found the climate to their liking and run wild, tangling old cotton patches along with their small-flowered native relatives. An old field is often alive with their tiny scarlet stars amongst the more subdued pink, white and blue of related species.

In the far South the fingerleaf morning-glory *(Ipomoea digitata)*, a perennial, is one of the giants of its genus. Several thick succulent stems arise from a tuber to a height of 20 feet or more, bearing widely spaced five- or seven-fingered leaves broader than a man's hand. Flowers often as much as 3 inches across, rosy pink with deeper throats, are borne many in a cluster over a long period. Since, like other tuberous-rooted vines, it may be grown in the North by storage of its tubers over winter, the range of this attractive vine should be liberally extended.

Yellow jessamine or Carolina jessamine *(Gelsemium sempervirens)*, often popularly called "jasmine," though widely distributed, seems not to be extensively cultivated. It is the state flower of South Carolina, and grows wild along the woods edge, twining and rambling over the bushes. We often come upon it in the midst of the forest, where it has grown up with the trees, unsuspected except when its fragrance permeates the whole woodland or its fallen yellow trumpets carpet the forest floor. Even then the cable-like stem, often hanging free from the high branches, may give the only clue to its precise whereabouts. Many have planted it with little success—shade for its roots, abundant water, and perhaps a nearly neutral soil being necessities.

Firecracker vine *(Manettia cordifolia)* is a tender vine which never gets out of hand, twining only to the eaves of a single-story house. Cut down by frost each year, it is hardy only where the ground never freezes; but its small, shining leaves make a very pleasing foliage mass, and the abundant, tubular, red flowers (1½ inches long and produced over a long season) make it a very attractive addition. It is one of the few South Americans on our list.

Coralvine *(Antigonon leptopus)* is one of the best-loved of all southern vines, and one of the most widely distributed. So tender as to be cut to the ground by frost as a matter of course, we find it in midsummer covering the verandas along whole streets and smothering entire fronts of houses. The usual color of its small flowers, garlanded like beads, is bright rosy pink; but when the white form is also present in a neighborhood, seedlings of any tint betwixt the two may be locally common. Climbing by tendrils, it loops and sags, and having reached the top of its support cascades down again before regaining its hold; so it is often covered with bloom from top to bottom.

Crossvine *(Bignonia capreolata)* is very spectacular on the edges of woodlands in May, where its massed trumpets cover small trees like a thrown blanket, but it is not generally accepted for cultivation. Its blooming season is short and quickly over; one day it is in glory and next morning, after a little rain, its crown is in the mire.

### More Rampant Vines

The Trumpet creeper *(Campsis radicans)* not much planted in the South except by those who use it to attract humming birds through the long, hot weeks of summer. Perhaps its rampant growth is not in its favor; but there is often prejudice against common things, especially those cherished by simple folk, who, never having known affluence, almost universally respond in a direct, impulsive way toward beauty without questioning its rarity or price.

Another of the bignonia family, catclaw vine (*Macfadyena unguis-cati*, formerly *Doxantha unguis-cati*), hardy only to Zone 8, consistently gives perhaps the finest foliage texture of any evergreen capable of completely covering the highest of brick walls. The small, narrow and dark leaflets are in pairs; what were once the terminal three have degenerated into three needle-pointed wiry claws which catch in mortar like steel hooks. With these the vine clambers easily up the tallest walls, and as easily over any shrubbery in its way. Although branching but sparsely, its multitude of stems and incorrigible vigor make up for the deficiency, since the stems swarm over each other and interweave to make a continuous cover. Rooted beneath azalea it is an especial menace, tougher than its competitor and more securely anchored. One may in desperation transplant and comb the roots of the outraged azalea, only to find that every cut fragment of *Doxantha* root and stem is cheerfully sending up new shoots. The golden flowers are of too brief duration to warrant its use in any but the most easily restricted situations.

Cherokee rose *(Rosa laevigata)* is often defended as the most valuable native rose in the southern states, so welcome and so fitting has it become to the landscape. High-climbing, rising to 40 feet or more, and conspicuous by its light green foliage at any time in summer, it is at its best when clothing a tree on the forest edge. In May, when dotted with its single white flowers nearly 4 inches across, it is a sight worth driving miles to see. (The name "Cherokee" is unfortunately often misapplied to another single-flowered rose—a Chinese adventurer, *Rosa bracteata*, which is not only far inferior in bloom but of a habit that has made it such a pest in grazing lands that its eradication has become a subject of considerable concern.)

Creeping Fig *(Ficus pumila)* is hardy only in the far South, for it withstands only a few degrees of frost. It is one of those Jekyll-and-Hyde plants that start out by matting a wall with diminutive, evergreen, deeply veined leaves so tender in appearance that it invites coddling. Abundantly able to care for itself when strongly rooted, it is capable of enveloping an entire building and raising upon it a forest of horizontal, coarse-leaved branches. These must be pruned away every year to preserve a trim effect. Although a single plant may go four or five stories high and cover 5000 square feet of wall, it is rather easily kept within bounds.

Kudzu *(Pueraria lobata)*, native to China and Japan, and frequently hailed as the savior of the South's eroded lands, is not always an unmixed blessing. Its place

George Taloumis

One of the most arresting and complex flowers a gardener is likely ever to see, passion-flower *(Passiflora incarnata)* is a common blue-flowered native in the South. A Brazilian relative is even larger and more colorful, with flowers four inches across.

is definitely in gullies and on sides of cut-banks and ravines. The difficulty is to make it stay there, for it travels underground as well as on the surface and is not easily controlled by any mechanical means. Our modern growth-regulating chemicals must be relied upon to keep it within bounds. Left to itself it could easily take the countryside, since it is not dismayed by trees 60 feet tall and often may be seen covering not only the clay banks where it was planted, but the face of the abutting forest as well.

### Unusual Colors

Blue flowers among vines are somewhat rare. Two of the violet-toned nightshades, *Solanum rantonettii* and the much coarser and more lavender Costa Rican nightshade *(S. wendlandii)* offer welcome change from a surfeit of pink and white. Neither will withstand frost below 20°F., but both may be easily started from cuttings in a warm temperature.

Passion flower *(Passiflora incarnata)* is a common native throughout the South found abundantly rambling over fences and in waste places; it is too common to be much appreciated by many save those so divorced from country living that it seems to them a rare thing, an exotic. There are few flowers more remarkable in appearance or more intricately formed. The crown of colored filaments overlying the ten-parted floral envelope, the whole overtopped with three styles, and the five large-anthered stamens joined to make a supporting tube, all together make a most fantastic assemblage, 2 to 3 inches across.

Blue crown passion flower *(P. caerulea)*, a Brazilian, is even larger and showier, 4 inches across, with the rays blue, white, and purple. It is hardy about as far north as its native relative, that is, into Virginia. Other species or hybrids, either white or of various combinations of white, blue, purple, and red are mostly tender, lending their presence only to

Florida when unprotected. Some of these come satisfactorily (though not quickly) from seed, but all, apparently, strike well from cuttings of ripened wood. The little annual relative with yellow blossoms an inch across *(P. lutea)* is common over much of the same territory as *P. incarnata,* but it is little noticed and is seldom recognized as being a passion flower at all.

### Less Hardy Vines

Evergreen wisteria *(Milletia megasperma)*, from Australia, looks somewhat like the familiar oriental species of wisteria, though considerably coarser and darker because of the thick, evergreen leaves. The flowers appear somewhat later in the spring, and since the stems are never bare, are apt to be securely hidden from casual observation. The racemes are short and closely packed with small, dark reddish-purple flowers of a distinctive fragrance. Hardiness to only about 20°F. considerably restricts its range.

Another tender evergreen, the star-jasmine *(Trachelospermum jasminoides)*, a Chinese acquisition, has been so long associated with the South that it has acquired the name of "Confederate," as though it were a native. The flowers are white, with a short tube and five twisted petals, and have an overpowering fragrance. Somewhat slow to start, after two or three years it becomes well rooted and will not only go to the house roof but will make such a heavy thatch of stems which accumulate leaves and bird nests, that it has to be continually reduced.

The farther one penetrates into the warmer portions of the South, those regions where freezing temperatures are less and less a limiting factor, the more spectacular are the flowers and flowering habits that come into view. Several vines are not fully hardy even along the Gulf Coast, which is subject to severe freezes now and then. They are commonly grown in that region, nonethless, on the gamble that they may survive several successive winters before a particularly severe cold spell destroys them. A series of warm winters promotes the extensive use of these tender species, only to be followed by discouragement when one or two cold nights (with temperatures below the mid-twenties) bring disaster. The discouragement is the more pronounced since the phenomenon occurs too rarely to accustom gardeners to losses and replacements any northern gardener would take as a matter of course. As a rule, plants are not protected, and their owners seem at a loss when faced with such emergencies.

The flowers of thunbergia *(T. grandiflora)*, unlike those of its annual relative of northern gardens *(T. alata)*, are large, and sky-blue on the wavy spreading border, nearly white in the throat. These flowers are borne in clusters of several to a dozen or more over a long period in midsummer, making a very beautiful display. The rather sandy, moist soil of the coastal region, with some leaf mold or rotted manure added,

Alamanda, a clambering evergreen viny shrub of frost-free climates. The handsome yellow trumpet-like flowers are up to five inches across.

*George Taloumis*

*Clerodendrum thomsoniae*, with its fine foliage and striking dark red and white flowers, is an excellent vine in warmer climates.

Buhle

seems to suit them well when the planting is made in light shade.

Two clerodendrums both called glorybower or bleeding-heart (*C. speciosum* and *C. thomsoniae*), are hardy enough to be grown wherever the winters are rather mild, since both bloom on new wood, and usually are not severely damaged when cut to earth by frost. Both species have small, red, tubular flowers. They are borne in flat clusters 4 to 5 inches across. The red tube is nearly hidden by the inflated, 5-angled calyx, so only the spreading margin and stamens protrude. In *C. thomsoniae* this papery calyx is ivory-white, in the other dull pinkish. In both it is persistent for weeks after the red corolla has dropped away, giving an increasingly large display as blooming progresses, though the older clusters gradually decline in brilliance. The large, ovate, deeply-veined, dark green leaves alone are almost sufficient reason for growing these vines.

Allamanda (*A. cathartica*) is one of those questionables which make one wonder, each night of temperatures below freezing, whether or not they have been completely killed. It is obtainable in half a dozen varieties, robust or slender, large- or small-flowered; the smallest flowers are slightly larger than those of the northern trumpet vine, and the greatest, fully 5 inches across. The size and brilliance of these largest blossoms are quite staggering.

Most of the bougainvilleas are hardy only in areas completely free from frost, and in consequence are almost strictly confined (in the east) to Florida. The one exception is *B. glabra sanderiana*. This relatively hardy Brazilian is seen all along the Gulf Coast, where its massive color makes it an important addition to the sunny garden. It will not bloom well in shade. Cuttings of this variety root without difficulty over heat, and it sometimes sows itself. The less hardy species, red, orange, gold, scarlet, lavender, or white, root with more difficulty and are likely to be less free in their flowering.

Again, in bougainvillea it is not the corolla that gives the show, but the three large, brilliantly colored bracts, paper-thin and persistent.

# VINES FOR WINTER BEAUTY

## A few vines give beauty the year round; these are well worth knowing

Donald Wyman

There are not many vines that have leaves or fruits all winter long, especially in northern gardens, so what few there are we should know well. First, of importance because it is grown from New England to Florida, is the English ivy *(Hedera helix),* a native of Europe but undoubtedly planted here in America since the earliest colonial times and now naturalizing itself in several places in the South..

At least seventy-five garden varieties of *Hedera helix* have been recognized by botanists recently and there are undoubtedly others. This is a considerably variable species, cultivated for centuries, probably one of the reasons why so many variants have been found. It is of interest to note that on old vines, the foliage of the branches on which appear the flowers and fruits, differs from the younger juvenile foliage. Cuttings taken of this older wood may be rooted (though less easily than juvenile portions), giving rise to shrubby plants, not at all like the vine which one customarily sees.

In the South, where this vine has been widely used and many old plants exist, the differences in the foliage on old and young portions of the vine are clearly present for all to see. In southern California, *Hedera* sp., especially *H. canariensis,* has been trained over wire fences and thus simulates excellent hedges. It withstands clipping well and of course functions as an evergreen hedge throughout the entire year. As a ground cover it hides rock piles or stone walls and covers trees and buildings.

A few varieties can be mentioned that show the different types available: 'Albany' is erect and shrubby in habit; 'Aureo-variegata' has leaves that are variegated with yellow, making this a truly beautiful specimen where it can be grown and displayed properly; 'Baltica,' one of the hardiest clones, apparently perfectly hardy in all but the most severe winters even in Boston; 'Conglomerata' with very small leaves, usually not over 1½ inches long and two-ranked on stiff upright stems, making it a popular and perky pot plant; 'Digitata' with leaves larger and five- to seven-lobed; 'Minima' with very small leaves but at the same time very unstable in habit; 'Pittsburgh' a variety in which lateral shoots appear in most of the leaf axils. These are only a few but will illustrate some of the variations available.

*J. Horace McFarland*

English ivy's dark, shiny, evergreen foliage is particularly welcome in winter when there is little else to catch and please the eye.

J. Horace McFarland

Creeping fig, an evergreen vine for the South and California, is particularly attractive when first filling in on a wall or building facade.

All in all *Hedera* is an excellent vine with many uses in the South as well as in the North and is one of the most common of all house plants also.

The only other truly evergreen vines in temperate regions are the various kinds of euonymus, mostly varieties of *E. fortunei,* which is itself a climber like the English ivy, attaching its small root-like holdfasts tenaciously to any upright with which it comes in contact. This native Chinese plant is also variable, and several varieties have arisen over the years. For a description of the principal varieties, see Lyle Blundell's article on page 53.

### Honeysuckles

Two honeysuckles must be again mentioned in this grouping of vines for winter beauty, namely, Hall's honeysuckle *(Lonicera japonica* 'Halliana') which has been thoroughly described elsewhere in these articles, and Henry honeysuckle *(L. henryi)* which is slightly more hardy and not as rampant a grower. Both have evergreen foliage except near the extreme limit of their range. (Boston, northern New York, and Ohio) and are adaptable as either ground covers or twining vines.

### Bittersweets

The bittersweets certainly must be mentioned, for, although there are other fruiting vines some of which hold their fruits long into fall, these hold their fruits far into the winter or until such time as the birds eat them. Two species are commonly grown, the native American bittersweet *(Celastrus scandens)* and the oriental bittersweet *(C. orbiculata).* In both the sexes are separate as is explained elsewhere, and in both the winter beauty is provided by the bright colored orange and red fruits.

The difference between these two species is that in the American bittersweet the fruits are borne in terminal clusters of many berries, while in the oriental bittersweet the fruits are borne in small lateral clusters. The leaves of the latter are also more rounded or orbicular than are those of the American native. The oriental species is especially robust and has become naturalized in much of the eastern United States.

### In the South

The farther south one goes, the more evergreen vines one finds in the gardens. South of Washington, D.C., for instance, in addition to the vines already mentioned, the twining scarlet kadsura *(Kadsura japonica)* begins to appear here and there in gardens. It is of value for its evergreen foliage, scarlet berries, and reddish autumn color. A few of the more protected gardens are fortunate in growing the blue crown passion flower *(Passiflora caerulea)* with semi-evergreen leaves, climbing by tendrils and with beautiful blue to pure white flowers, one of the most beautiful of the passion flowers that can be grown in this country. One of the best evergreen climbers for this particular area is *Pileostegia viburnoides* with its excellent glossy green leaves, and

a growing habit similar to that of the climbing hydrangea.

A little farther south the Himalayan magnolia-vine *(Schisandra propinqua)* can be used. An evergreen vine with orange flowers and brilliant red berries, unfortunately it is in that group of plants which have all the staminate flowers on one plant and the fruiting or pistillate flowers on another. The catclaw funnel creeper *(Macfadyena unguis-cati)* also is a popular evergreen.

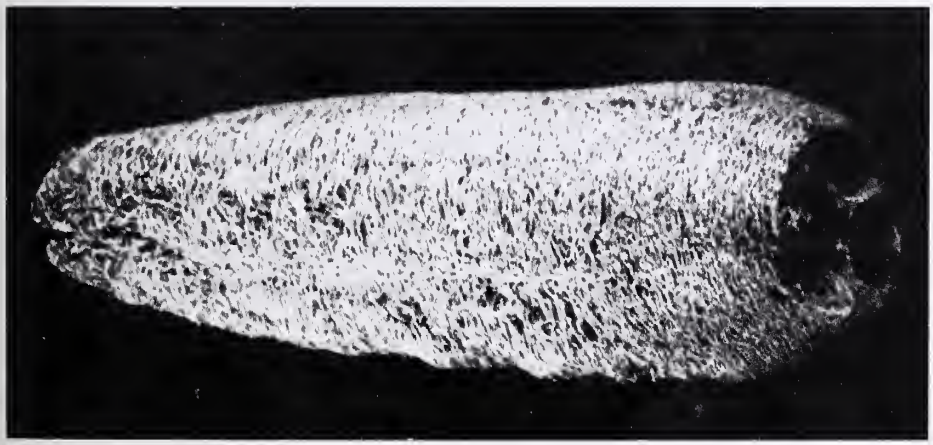
From Charleston, South Carolina, south into even warmer climates, other evergreen vines are used, such as the beautiful purple-bell cobaea *(Cobaea scandens)*. Sometimes called cup-and-saucer vine, it has 2-inch-long bell-shaped flowers of lavender to purple, tenacious tendrils, and the excellent characteristic of blooming during a six month period. The creeping fig *(Ficus pumila)* should certainly not be overlooked, for as a closely attached small-leaved evergreen vine on a wall it really has no peers. In fact, the stems hold themselves so tightly to the wall, that when they cross each other they frequently become grafted together. The young growth of this vine is what is mostly desired for it forms the perfect closely knit wall covering.

These are a few of the vines of interest during winter. Though those which can be grown in the far South are more numerous and varied in character than the species available in the North, all can add a bit of cheerfulness to any garden where they prove hardy.

# Dishcloth Gourd

The dishcloth gourd, also called vegetable sponge, is an interesting curiosity, used to some extent commercially. The long slender fruit has a fibrous interior that furnishes a satisfactory sponge-like material when it is dried and the seeds are removed. In some parts of the world young fruits are eaten as a vegetable. The fruit itself is not as colorful as are most gourds, but the yellow flowers, which may be five inches across, are quite showy. The vine makes a useful late summer screen.

There are several species, *Luffa aegyptiaca* being the most commonly grown. It can be grown in the northern United States, but needs a long growing season to fruit abundantly. The plants are not demanding, but like full sun. Culture is much the same as for cucumber or melons. Good for pot scrubbing or in the bath for dry skin spots.



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## AN INVITATION TO JOIN AND ENJOY

**A man does not plant a tree for himself;**
**he plants it for posterity.**
**—Alexander Smith**

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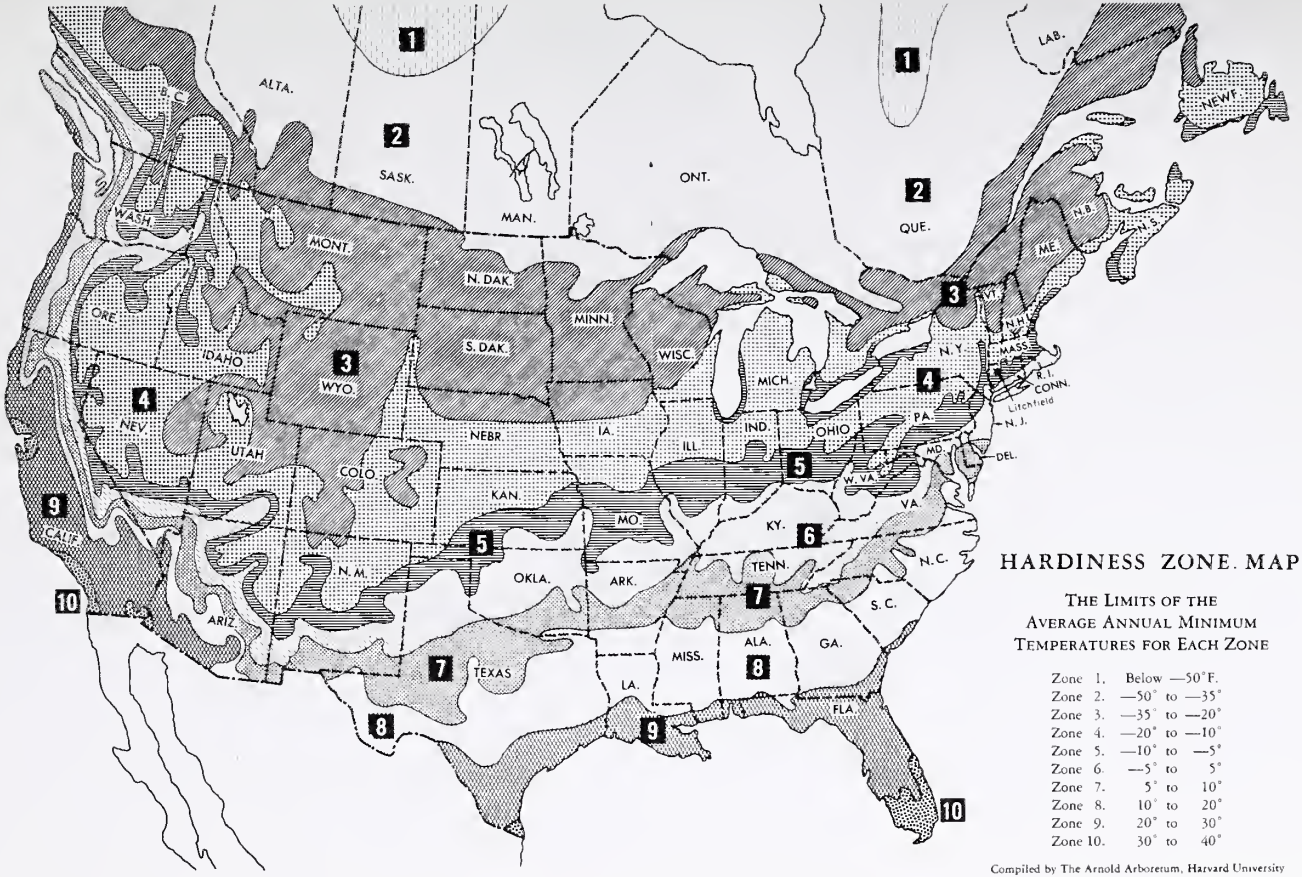


# HARDINESS ZONE MAP

## The Limits of the Average Annual Minimum Temperatures for Each Zone

| | | | | |
|---|---|---|---|---|
| Zone 1. | Below | —50° | F. | |
| Zone 2. | —50° | to | —35° | |
| Zone 3. | —35° | to | —20° | |
| Zone 4. | —20° | to | —10° | |
| Zone 5. | —10° | to | —5° | |
| Zone 6. | —5° | to | 5° | |
| Zone 7. | 5° | to | 10° | |
| Zone 8. | 10° | to | 20° | |
| Zone 9. | 20° | to | 30° | |
| Zone 10. | 30° | to | 40° | |

Compiled by The Arnold Arboretum, Harvard University

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BROOKLYN BOTANIC GARDEN RECORD

# PLANTS & GARDENS

# PERENNIALS
## AND THEIR USES

- Selection, Planting & Propagation Guides
- Maximum Performance with Minimum Maintenance
- Best Perennials for Different Geographic Areas
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Vol. 34 No. 3
(Autumn, 1978)

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BROOKLYN BOTANIC GARDEN RECORD
PLANTS & GARDENS

# PERENNIALS AND THEIR USES

Vol. 34 Autumn (November) 1978 No. 3

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George Taloumis

A garden is as good as its setting. Small trees and stonewall with pineapple ornament, a symbol of hospitality, frame a border of summer-flowering perennials, which includes heliopsis and *Aster* x *frikartii*. In the foreground are box and vinca.

## Letter from the Brooklyn Botanic Garden

There was a time not many years ago when nearly everybody, it seemed, wanted green gardens. They were restful and cooling and, above all, required little care (except the lawn) because they depended largely on broad-leaved and needle evergreens. Many of these plants were refined slow growers and blended inconspicuously into the landscape. There was indeed a brief burst of exuberance when the azaleas came into bloom, but monochromatic greenery prevailed the rest of the year. This was a reaction no doubt to a still earlier period when the large, brightly colored blossoms of certain annuals and perennials were esteemed, often at the expense of architectural unity and the exchequer, for these flower-focused gardens—plant collections really, not gardens—were costly and time-consuming to tend.

In the last few years a revival of interest in perennials has taken place, in part as a reaction to the dullness of some "green" gardens. Fashions in horticulture never come quite full circle, though. (History never repeats itself; only historians do.) The perennials that are most in demand these days are low-maintenance sorts (day-lilies, hostas) which have a long season of floral attractiveness but which also blend well with a wide range of plants, including trees and shrubs. Those perennials requiring an inordinate amount of care have not fared so well.

The traditional flower border is still much in evidence, as is the green garden, but what is significant today is that an increasing number of gardeners are beginning to use perennials as components, as parts of the landscape, in some cases even as ground covers. Trees and shrubs framed by open spaces (the lawn is not dead) may be the bones of a garden, but perennials, properly used, are the sinews that bind. Choices may be modest, as with a few sundrops (*Oenothera tetragona*) placed under a clump of white birches, or bold, as with a group of roughly sculptured plume-poppies (*Macleaya cordata*) planted in the distance as a seasonal focal point.

A cornucopia of artistic possibilities is open to us by the appropriate employment of perennials. The joy of gardening, it seems to me, is in experimenting with agreeable combinations of new and unusual plants, as well as recombinations of old standbys. Although I have more than a passing interest in woody plants, my own garden consists mainly of perennials because they provide greater opportunities for combinations, hence variety—and they take less space. They are as permanent as I want them to be and there is no difficulty in hoicking them out if anything goes awry. Each Sunday evening a list is compiled of what is in bloom, and this is helpful in planning the next year's combinations.

The Botanic Garden has been fortunate to enroll a broadly experienced and learned team of Contributors for this Handbook. To each and every one, many thanks for taking the time and effort to provide the basic information about perennials that is needed for an understanding of this beautiful and diversified section of the plant kingdom.

Sincerely,

Frederick McGourty, Jr.

Editor

*There are many reasons for . . .*

# GETTING STARTED WITH PERENNIALS

Edmond O. Moulin and Frederick McGourty, Jr.

Why grow them? Every true gardener has fancies. There are philodendron freaks, scarlet-sage savorers, maple mavens. However, few groups of plants offer the variety and beauty, as well as sense of permanence, that herbaceous perennials do. There is always something to look forward to in the carefully arranged garden, and old plant friends keep returning year after year at their appointed times. Most of them don't flower for more than three or four weeks, and perhaps this fleeting trait endears them to us more than does the summer-long bloom of most annuals. If we were always to eat filet mignon, our appetites would become jaded. A varied menu (not necessarily a smorgasbord) helps, and we appreciate what the season has to offer.

With perennials we can tailor a garden to spring, if that is when we are home to enjoy it most, to summer if that is the time of year most appropriate for us, or, in some cases, to autumn. We can also choose plants for a continuing series of bloom, or for their seasonal architectural traits in or out of flower. They needn't even be grown in the garden as such but used as accents by a door or as complements to shrubs and trees.

The old-time borders twelve feet wide (and what monstrosities they were to take care of) have left the garden scene, a felicitous departure because they had given perennials a bad name for years. The lawn then expanded, sometimes into areas where it did not really belong, and low-maintenance greenery (pachysandra and its soul brothers) came into vogue, though it was boring after a while. Gradually gardeners rediscovered perennials and their uses, learning that not all of these plants require an army of hired hands to tend them.

The new borders are streamlined for lower maintenance, and well-planned ones are usually not more than six feet wide, with a catwalk of sorts in the rear so they are accessible for weeding from either side. Often, the new borders consist of just an odd corner for hostas, daylilies, sedums or other near-indestructibles which grow almost as well on a city dump as in a dutifully preened bed. Fewer kinds of perennials are used now, but often in larger quantities for bold effect. In successful instances they have become a part of the landscape, not an imposition on it.

And always there is imagination at work, for perennial gardening at its best is an art form, one in which individual expression and experiment are possible in a variety of ways, particularly with pleasing combinations of plants. Of course, finding the right plant for the right spot is not always easy, and mistakes will be made. However, so long as the overall design and soil preparation are good, the only corrective that may be needed is a sturdy trowel.

### Site

The ideal site is one with a southeastern exposure, sunny and with deep, well drained soil. There is no reason to be disheartened, however, if you cannot provide the very best conditions. Few of us can, and there are a wealth of perennials for "difficult" areas (see pp. 80-81), so many in fact that gardeners who have experience with less-than-perfect sites have long since stopped thinking of them as problems but as opportunities.

One gardener we know has grown plants on a north-facing slope for fifteen years, with several borders also facing west, and he has not found the site to be a particular burden. His spring-flowering perennials bloom a couple of weeks later than the neighbor's because of the northern exposure (but they last longer), and he must take into consideration the subdued light at certain times of the year. His west-facing borders are subject to the hot afternoon sun, but a number of durable long-blooming perennials don't seem to mind, although they require an extra winter cover of evergreen boughs or salt

hay to prevent the heaving of roots that may occur following a series of warm days and cold nights in March. A few more plants than usual need staking too, because of the prevailing westerly winds. However, like a one-armed poker player he is unaware of his handicap as long as he is winning.

Gardeners as a group are good-natured grumblers, and it was no doubt a gardener who coined the phrase about the grass being greener on the other side of the fence. Special grumbles are reserved for shade, in one's own garden, that is. True, the majority of perennials grow best in the sun, but a number either tolerate or thrive in light shade, and a few are able to cope with deep shade. The usual source of shade is from tall, established trees, but these can be pruned of lower limbs to let in more light and allow for better air circulation. Even just the removal of dead wood is a surprising help.

On shaded sites, the greatest problem is not shade itself but root competition from nearby trees. Under these circumstances special attention must be given to soil preparation, and it should be repeated every few years unless especially tenacious perennials, such as epimediums, hostas and liriopes, are chosen. Tree roots, sad to say, benefit from the soil preparation supposedly reserved for perennials and have an inimitable way of growing back. Sometimes, it must be admitted, the best course is to leave things be.

### Soil

All gardening except hydroponics begins with the soil, but since most perennials are to be in place for a number of years, good preparation pays really high dividends. Traditional authorities, who are apt to be martinets at heart, stress the desirability of double digging with a stout spade, but few gardeners who have prepared a border by this sadistic method have the inclination or strength of back to do a second one the same way. Double digging, which is essentially the excavation and rearrangement (with amendments) of two thick layers of soil, does indeed give good results, particularly with deep-rooted kinds of perennials, but it passed from the scene with the estate gardener and his retinue. Perhaps not really many old-timers honored the practice, either. A while ago we questioned a skilled and respected veteran gardener, a man in his nineties, and he replied: "Sure, it was routine to *advise* people to do it. I personally never double dug a border and I certainly don't plan to begin now!"

Today, fortunately, there is the rototiller, which can be rented from a garden shop for a Saturday morning, and results with it are quite satisfactory, considering the alternatives. True, it is not feasible to turn over the soil more than eight or ten inches deep with a rototiller, but this is sufficient for most perennials unless you want studlike performance. More important is the thorough incorporation of organic matter (peat moss or compost), dolomitic limestone and superphosphate (if a soil test indicates a need for these, as it probably will east of the Mississippi), and coarse builder's sand, should the soil be heavy clay. (Don't add merely sand to clay soil; it will form concrete.) A six-inch layer of peat moss worked in (plus a one-inch layer of sand if soil is heavy) is none too much. Compost, unless from rotted leaves exclusively, may contain numerous weed seeds, but if it is the only material at hand, put it to work.

If it is autumn and there is a shortage of peat moss or compost, freshly shredded tree leaves may be substituted, for most will decompose over winter and provide humus. (In case of temporary yellowing of plant foliage the following year, a light application of high-nitrogen fertilizer will be beneficial.) All of these amendments help build up the soil level, providing good structure and good drainage, which is essential for most perennials.

Some times of year are better than others for digging a border, autumn being the very best, since the various materials have a chance to "mellow" over winter before planting. Even then it does no harm, quite late in autumn, to add some 5-10-5 commercial fertilizer, and established beds can profit from an application of 10-6-4 in late winter. However, rather few perennials (astilbe, chrysanthemum, delphinium) have high nutritional demands, or in fact exacting pH needs

George Taloumis

Day-lilies provide beauty with low maintenance. There are many cultivars; shown here is 'Starburst'.

(6.0-6.5 being ideal for most). If the soil has been properly prepared ahead of time, little additional fertilizing may be needed for some years, and then perhaps only on a spot basis. The plants will tell you.

Can't prepare a border in autumn? This is no reason for not doing it at all! The task can be accomplished almost any time of year when the soil is neither soggy nor frozen. First-year performance may not be quite as lush, but it should be satisfactory provided a couple of weeks pass between digging and planting so the soil has a chance to settle.

If a new border is to be placed in a lawn, the removal of sod and rototilling will probably result in few new weeds, but if the area for planting has been let go for some time, there will be trouble. In this case it may be wise the first year to grow just annuals and a few perennials that should be lifted for division after a year or so anyway (*e.g.*, chrysanthemums, asters). This will make weeding and perhaps even a second rototilling easier. Another factor is the initial cost of perennials, which is not low if an entire border is to be started from scratch. By growing only a few kinds of perennials in the beginning, you will also have an opportunity to evaluate them and see whether they are well suited for the site.

### Shape of Border

Borders with gently curved lines appeal to more people these days than the formal rectangles and circles of grandma's time. The latter were essentially apart from the landscape and did not take into account the natural contours of a site. One of the most important things you can do before starting a perennial border is to choose the spot as carefully as you would one for an addition to the house. What will it look like when completed? Will it be aesthetically the right size? What is the most frequent angle of vision? Is the border meant to be seen from more than one side? Is drainage good? What are the light factors, now and at other times of year? Are there other features—a boulder, a small tree—to be incorporated for more interest?

A garden hose is for more than water-

ing. It is a very useful instrument for experimenting with the possible lines of a new border. Gently curve it along the ground and visualize the shape of the border-to-be, and even place a few stakes in the area to get an idea of desired plant height. And don't make snap decisions you may be sorry for years later.

It used to be that borders were often associated with hedges or stone walls, and many still are. They had a pleasant way of blending with the landscape and had a natural appearance (as long as they were in scale), but there were some cultural shortcomings. Roots from hedge plants were greedy invaders of the border, and stone walls harbored mice that fed on the roots of perennials. It was hard to weed around back-of-the-border plants (unless there was a hidden path in the rear), and poor air circulation encouraged mildew. Plants often didn't receive as much light as they should have, becoming leggy and needing staking.

In recent years the idea of informal, irregularly shaped "island beds" in the lawn has been gaining favor, especially in England, where nurseryman Alan Bloom is the leading proponent. Such beds circumvent the problems mentioned above, and they make particular sense concerning the actual culture of plants. However, their placement in lawns must be thoughtfully conceived so vistas, focal points and scale are preserved. A limiting factor in areas with long winters, notably ones without much snow cover, is the bareness of island beds then. We are speaking mainly of perennials whose foliage dies to the ground in the cold months, which are longer than most northerners care to admit. Unless there is some way of tying such beds in with other architectural features, they can present a rather stark appearance for a significant period.

The spacing of perennials in borders causes more concern to new gardeners than it should. As a rule, small, front-of-the border plants are best placed about one foot apart, and taller ones two or even three feet apart, with an extra foot-or-so between groups of plants. Some people like dense, very full borders, which tend to smother weeds (as well as some of their own progeny), others prefer to grow plants individually as full specimens. Learn about growth habit before buying, for the width of some perennials at maturity can be as great as or greater than height, baby's-breath (*Gypsophila*), sea-lavender (*Limonium*) and some hostas being examples. Often just one plant of these will suffice and look better than a group.

Plants are customarily set out at least three to five of a kind, or sometimes in larger groups or drifts for dramatic effect. Too many kinds create a busy picture, too few a monotonous one. Occasional repetition of a group of plants (or colors) through the border aids unity. These points are brought home with practice, and confidence increases each year. Economics, it should be mentioned, determines in part the initial planting, and

George Taloumis

The bold *Hosta fortunei* 'Marginata-Alba' brightens dark corners in many a garden. Hostas are durable long-lived plants needing little care.

many gardeners start with only one plant of a kind, then divide it the second year, gaining several additional plants. In three years the thrifty gardener usually has as many plants as he wants, even for drifts.

The successful use of color comes partly with practice, too. New gardeners seem excessively fond of bright color itself, experienced ones are interested in how a new color or shade will complement others in a garden. Experimenting can be great fun and presents less danger than decorating a new room, since perennials can at least be moved about. It helps to remember that white is the great sanitizer and has saved many a strident combination in the garden. Also note that distance tones down loudness. The use of color can and should reflect a gardener's own personality, so don't be intimidated by your neighbor's over-the-fence comments. He may have a mauve-and-orange bathroom.

### For Lower Maintenance

Mulching is probably the biggest key to lower maintenance in the perennial border, for it lessens the need for water and cuts down on weed-seed germination. The area should be clean-cultivated before mulch is applied in spring. Mulch can consist of any number of materials, but those that decompose and form humus within a year or two are superior, since this is composting-in-place and the topsoil is being continually renewed. Tree leaves ground up in autumn by a shredder or a rotary mower and set aside in a pile over winter make a good mulch the following spring. Less common but satisfactory are bagasse and licorice root, also buckwheat hulls mixed with sawdust. They are preferable to the common type of peat moss, which cakes when dry. A two-or-three-inch layer of mulch is usually enough, but make sure not to cover the base of perennials when spreading it, since this may induce crown rot.

Some perennials need less care than others, a prime point to consider when purchasing them. If plants require frequent division, are pest-prone or need staking, think twice before incorporating very many of them in the scheme.

Many tall growers need staking, especially if they are partly shaded and you have a heavy hand with fertilizer. Most garden centers supply a variety of stakes for different purposes, but the low-budget gardener may substitute sapling stems or twiggy birch brush with as good effect. The stakes should be applied early, before growth flops, and they should be as inconspicuous as possible when plants are in flower. Always keep some coarse, dull-colored twine on hand for emergency purposes.

In most parts of the country, supplementary watering is necessary from time to time. Soaker hoses are ideal for the purpose, since overhead spraying may cause fungal problems. Early-morning watering is preferable to an evening application, and it should be fairly deep. Plenty of humus in the soil, generous mulching and protection of plants from hot afternoon sun lessen the need for watering. If your summers are especially dry, selecting drought-resistant perennials is, of course, an important consideration (see p. 81).

### A Few Favorites

Peak bloom in the perennial borders at the Brooklyn Botanic Garden is in the month of June. Flowering trees and shrubs, as well as spring bulbs, provide the main display earlier in the season, but they taper off toward the end of May, and annuals don't come into their own much before July, so the perennials that have been chosen for June bloom serve as a transition, as well as for beauty in their own right. These include delphiniums, bearded iris, peonies and oriental poppies (of which the foliage dies down in midsummer). Coreopsis and baby's-breath come along as the month progresses, as do Shasta daisies, some of the alliums and the brilliant orange 'Enchantment' lily. There are also day-lilies, bee balm, veronica and a host of other fine perennials. Some of these continue well into summer, when the borders are framed by stately rosemallows (*Hibiscus* hybrids). If you would like an introduction to perennials, please consider this a cordial invitation to come visit the Botanic Garden sometime in June when they are at their very best.

George Taloumis

Astilbes, day-lilies and dwarf dahlias.

*A testament for . . .*

# HARDY PERENNIALS

## Alan Bloom

Reprinted from PERENNIALS FOR YOUR GARDEN (Charles Scribner's Sons, New York, 1975)

It is my belief that in terms of value for money and effort, hardy perennials exceed any other section of decorative gardening. It was nearly fifty years ago when I first became attracted to them, and my main working life has been devoted to them. It is on this experience that the above testament of belief is based. But experience covers more than knowledge of plants. It has to include one's failures, the amount of work—some pleasant, some tedious—which has been entailed. For many years I had to confine work to the production of hardy perennials for sale, working up a mainly wholesale business. It was not until the mid-1950s that I was able to make a real garden devoted almost entirely to perennials. By 1962 it covered five acres and contained about five thousand different kinds.

Among the thousands of visitors who come to see this garden every year are a few who find it a little disheartening. It's all very well, they say, but I have the setting and the scope for island beds and really "going to town" on perennials, but they have only a small garden patch, and they find even this difficult to keep tidy and colorful. My answer to them is that no matter how small or even inhospitable, there are kinds of plants that will grow there, if a careful choice is made. They cannot expect something for nothing. It takes thinking time as well as effort to get the best out of any garden space. The axiom that what you get from life is measured by what is put into it, applies also to gardening.

It must be said that some forms of gardening are more demanding than others. Annual bedding is probably the costliest in this respect. A few people have gone in entirely for shrubs or ground covers but are seldom pleased with the result which, even if labor-saving, provides little by way of interest. Even a garden entirely of lawn needs frequent, regular attention and gives nothing but a sward of greenery.

Hardy perennials are a two-way investment. The initial cost, relative to shrubs or ground covers, is very low. Yet having made ordinary preparations and a careful choice of hardy perennials, one has a variety of plants that will not only live on from year to year, providing color and beauty, but interest as well. It is the latter that inspires and stimulates and makes the little effort required by way of maintenance infinitely worthwhile. This is the reason why, speaking from experience, my belief in the value of hardy perennials has increased with the passage of time.

*Roche*

Lavender

*There are many perennials . . .*

# FOR OLD-TIME GARDENS

The settlers of America didn't have much time for ornamental plants, and cottage gardens never really evolved here as they did in England. Most of the perennials cultivated in gardens were herbs, grown mainly for home remedies, for kitchen purposes to relieve the monotony of a restricted diet or to disguise the taste of gamy meats, and for fragrance when dried, since the air in homes was close and people didn't bathe as often as they do today.

Among herbs introduced at an early date were artemisias, lavender, sage, mints, chives, santolina, garden-heliotrope (*Valeriana officinalis*), orris root (*Iris florentina*) and sweet cicely (*Myrrhis odorata*). They have a place in the perennial border today, and some of them are first-rate garden plants. Others, while attractive, spread from gardens to the field or roadside at a fast rate. These included coltsfoot (*Tussilago*), which was used in cough remedies, angelica (for confections), tansy (*Tanacetum*) (for kitchen use), teasel (*Dipsacus*), used for combing wool, and lady's bedstraw (*Galium verum*), a dye plant.

These herbs were part of everyday life well into the 19th century and, along with "medicinal" plants, were a staple of the seed purveyors, among them the remarkable Shaker religious sect. (To gain an idea of what seeds were sold, a visit to the restoration of the Shaker Village in Hancock, Massachusetts, is most instructive. The Shakers, in addition to being farmers and furniture makers of note, were in some respects the Burpees of the last century.)

Other plants grown in the early years of the Republic, or before, can be separated into geographical groups. Not surprisingly, the large proportion of ornamental perennials, such as there were, came from Europe, and a number of them were introduced for reasons apart from their garden attractiveness. They included feverfew (*Chrysanthemum parthenium*), sneezeweed (*Achillea ptarmica*), now seen mostly in a double-flowered form, 'The Pearl', whose long-lasting blossoms

resemble buttons, and golden-marguerite (*Anthemis tinctoria*), which has finely cut, aromatic foliage and yellow daisylike flowers. Another was dropwort (*Filipendula hexapetala, vulgaris* of some botanists) which is often mistaken for a fern when it is not in flower.

Dame's-rocket (*Hesperis matronalis*), a long-naturalized citizen, has sweetly scented, late-spring, magenta-colored flowers and is sometimes confused with phlox. Its white-flowered variant was one of Marie Antoinette's favorites and is still grown today. Dianthus were also valued for their fragrance. Of lesser note but occasionally gracing gardens was musk mallow (*Malva moschata*), with rose-mauve or white blossoms resembling hollyhocks (an old-time biennial).

Other perennials introduced from Europe in the dim past were German iris (*I. germanica*), whose violet flowers still adorn old gardens, and the brilliant red Maltese cross (*Lychnis chalcedonica*), which has a historical association with Christianity tracing back to the Crusades; also, perennial cornflower (*Centaurea montana*) and gas plant (*Dictamnus albus*), whose flowers are a source of delight to children on an early-summer evening when a lighted match ignites the "gas" with a small puff. The vibrantly colored rose campion (*Lychnis coronaria*), Memorial Day peony (*Paeonia officinalis*) and *Veronica spicata* were also part of the American garden scene.

Some of the most attractive native plants of the eastern United States were brought into gardens as they become known, although they were not so well documented as plants from Europe. Among them were butterfly-weed (*Asclepias tuberosa*), the red-flowered bee balm or Oswego-tea (*Monarda didyma*) and the tall white goatsbeard (*Aruncus dioicus*), unusual in that it is also native to the Old World; also, wild blue indigo (*Baptisia australis*), summer phlox (*P. paniculata*), stokesia, lupines and delphiniums. Martha Washington plume (*Filipendula rubra* 'Venusta'), with deep rose flowers on 6- or 7-foot-tall stalks, was likely cultivated very early, too. Golden-glow (*Rudbeckia laciniata* 'Hor-

The robust-growing tansy (*Tanacetum*), with yellow flowers in late summer, and teasel (*Dipsacus*) are old-time garden plants that have gone wild in many parts of the country.

Roche

M. Joyner

George Taloumis

Lemon day-lily (*Hemerocallis flava*) blooms in spring about the same time that early roses appear. The flowers are delightfully scented. Plants are tough and long-lived, often seen in old cemeteries but rarely now in gardens.

tensia') became popular at the end of the 19th century, and its double yellow flowers on 7-foot stems are still a familiar sight near old farmhouses in late summer.

The Asiatic introductions were understandably fewer, and most of them arrived in the New World via Europe. The common bleeding heart (*Dicentra spectabilis*), from China, was—and still is—one of the most beloved perennials because of its rosy-red lady's-locket flowers in spring. Plants grow about 3 feet tall and the foliage usually dies back in midsummer, so a planting of day-lilies in front is needed to hide the slow necrosis that takes place.

Two day-lilies (*Hemerocallis*), also from China, were on the garden scene in America in colonial times. The most widely planted was actually a cultivar, the tawny day-lily (*H. fulva* 'Europa'). It has become extensively naturalized, a phenomenon that is interesting because the plants set no seed (pollen is fertile, however) and can only be increased by vegetative means, *e.g.*, the breaking off of a piece of root. Man, animals and floods are presumably the main means of dispersal. A double-flowered cultivar of tawny day-lily, 'Kwanso', is also seen in old-time gardens. Variegation in its foliage was once apparently common but is rare today. Both 'Europa' and 'Kwanso' are very vigorous growers, almost too much so for many gardens today, and they have been superseded by countless cultivars.

The lemon day-lily (*H. flava; liliosphodelus* of some botanists), an intensely fragrant spring bloomer with smaller foliage than *H. fulva,* is not as common, but it is still encountered around farms, in old cemeteries and near cellar-holes.

The Chinese garden peony (*Paeonia lactiflora*), though a later arrival than the European one (*P. officinalis*), qualifies as an old-time garden plant. A popular 19th-century cultivar, 'Festiva Maxima' (1851), with double white flowers speckled with crimson, is durable, and many gardeners prefer it to the numerous *lactiflora* hybrids which are in the trade today.

Do the old-timers still have a place in modern gardens? They probably don't for many people, especially those taken with the notion of being the first on the block to grow a new phlox, day-lily or iris. For others, the charm of simplicity, durability and, often, fragrance, is important. This is not to say that the old-timers were necessarily better garden plants (some were obviously not), but in many cases they will be around long after many thoroughbred cultivars of today have been forgotten. And there is a certain innate pleasure in growing—and enjoying—the same plants our forebears did.

*George Taloumis*

# FOR AN IDLE SUMMER IDYLL

Frederick McGourty, Jr.

Adapted from THE AVANT GARDENER (Vol. 9, No. 3)

The kind of garden you have depends in part on where you live. When I recently visited a friend in Tidewater Virginia and told her of my interest in flowers for late summer bloom in my New England garden, she expressed surprise. "You mean August and September? The last thing a southerner wants to do in those dog-day months is to step into the garden. They'd wilt a person faster than a lettuce leaf dropped on the doorstep at midday. Our good seasons are spring and perhaps autumn, so we arrange bloom in our gardens for those times."

Swamp Yankees and other northerners view the seasons differently. Spring is usually short, damp and cold, and in the hardscrabble hill country of northern Connecticut where I garden, black flies eat a person alive in the month of May if he so much as steps outside to peek at the grass-encrusted *Phlox subulata* screaming magenta for attention. Besides, there is a wealth of wildflowers along the roadside, and the beauty of the natural scene often makes man's garden fatuous in comparison.

August and September customarily provide the finest weather of the year in New England—three-dimensional days for hammock lovers, barbecue buffs, vacationers-at-home and other indolent souls like myself. Let the early-season gardener admire his evanescent Oriental poppies and the false riches of basket-of-gold; by midsummer he will be wondering where all the flowers have gone. Many of the good perennials have set up summer camp in the gardens of patient growers.

Spires of black snakeroot (*Cimicifuga racemosa*) tower above regal lilies, feverfew and silver mound artemisia in a New England country garden.

George Taloumis

Heliopsis, single- or double-flowered, is a long-blooming, rugged yellow daisy noted for its summer display. It usually grows 3-4′ tall. Of easiest culture.

**Lazy-Day Daisies**

There is no dearth of perennials for late summer color, although casual gardeners seem to think of the season in terms of the three H's (*Helianthus, Helenium* and *Heliopsis*), with an occasional R for *Rudbeckia*. It is true that overuse of these long-flowering, sun-loving, easy-to-grow yellow daisies can cause monotony of color and form in a garden. As with any plants, including the various cushion mums that commonly bloom in late summer, the grower who has found a good group must exercise a certain restraint. It is one thing to have the backbone of a garden yellow, quite another to have the entire skeleton the same color. (Exception: all-white gardens, which are hauntingly beautiful on a summer evening.)

Before turning to other plants let us look briefly at the three H's and R, which are mostly in the 3′ to 4′ height category. *Heliopsis helianthoides* 'Incomparabilis', a relatively old cultivar (1932) so far as perennials go, is still one of the most widely grown because of its profusion of semi-double blooms with conspicuous eyes, which are produced from early July to mid-September in New England (add two weeks at either end for the mid-Atlantic states). It's a vigorous grower and the aphids that occasionally feed on the stems seem to bother observers more than they do the plant. 'Gold Greenheart' is similar, with disc flowers changing from green to yellow.

Perennial sunflowers are represented in gardens by *Helianthus* x *multiflorus* 'Flore-pleno' and 'Loddon Gold'. The taller-growing Jerusalem artichoke (*H. tuberosus*) is spectacular in September but is invasive and needs staking in the well-nourished perennial border. Best consign it to the back forty if you want the crispy water-chestnut-flavored tubers for kitchen use. Thin-leaf sunflower (*H. decapetalus*), a native easterner often growing in the woods or along the roadside, flowers in August. It's a rapid runner but of use in the wild garden because of its shade tolerance, uncommon in yellow daisies.

*Helenium autumnale*, which has several cultivars, is not apt to win any gold medals because of the 4′ to 6′ height, disappointingly small flowers of yellow, copper or red tints, and worse-for-wear-as-summer-goes-on foliage, but it fills a gap between July bee-balms and September mums. Pinch stems a couple of times in spring as you would a chrysanthemum, give plants an occasional summer water-

*Helenium autumnale* is valued for late summer bloom. Most cultivars have yellow or coppery tints. It performs best in full sun, especially if staking is to be avoided.

ing and weak soluble fertilizer, and they will be a pleasant surprise. Lower-growing sorts include 'Moerheim Beauty' (coppery red) and 'Pumilum Magnificum' (yellow).

Coneflowers (*Rudbeckia*) are part of late summer, especially *R. fulgida* 'Goldsturm', which is a perennial, long-blooming black-eyed Susan, usually less than 3′ tall. Quite different is *R. laciniata* 'Goldquelle', with double flowers as dowdy as the rustic golden-glow (*R. l.* 'Hortensia') of turn-of-the century dooryards, but growing to only 3′ or 4′, half the latter's height. Golden-glow itself is floppily indestructible and, like lilacs, may still be seen around cellar holes of homes torn down or fallen down two or three generations ago. It's strictly a nostalgia plant.

If a purple coneflower appeals to you, *Echinacea purpurea* and its less muddy cultivars ('Robert Bloom', 'The King'), which begin to bloom in midsummer, are ruggedly handsome. The central disc or cone makes a distinguished dried decoration but should be picked before many seeds are dropped; they seem to have one hundred percent germination the following year, as procrastinators have ruefully learned. In fact, for tidiness and to prevent unwanted seedlings, remove the flowers of nearly all perennials as they fade. In some cases it encourages reblooming during the same summer, too.

### Summer Standouts

The principles of traditional flower arrangement can be applied to perennial borders, from which in turn they were probably derived. Though a few daisies (even just one) in a bowl might satisfy the rudimentary aesthetic needs of tired gardeners venturing indoors for a late dinner, the interior designer thinks in terms of flower and growth forms—rounded, vertical and filler. It is the difference between a bouquet and an arrangement, and the same distinction can be drawn in the garden. The gardener, of course, is working on a larger scale and has at his disposal a wider range of plant materials (a usually spurious term for plants), but the question remains—how to break up the monotone and monochrome of the daisies?

Let's start with the verticals. Probably the archetype is liatris, a member of the same Composite Family to which the common daisies belong, even though the flowers appear decidedly different. Small, spidery and arranged in dense spikes, the

Roche

Astilbes rank with the finest perennials. If cultivars are chosen carefully, flowers may be had the better part of summer. Principal need is summer moisture, plus light shade in most climates.

blooms range in color from purple to pink and white. Plants grow 3′ to 6′ tall, depending on cultivar, and are sparsely branched with very narrow leaves. Superior types include *Liatris scariosa* 'September Glory' and 'White Spire'. Earlier flowering (purple), dense and reblooming if cut back after the first wave is *L. spicata* 'Kobold'. Give them sun and good drainage, and keep a few stakes handy for the first two.

Gardeners have mixed feelings about loosestrife (*Lythrum salicaria*) if they live in areas where it has become naturalized. It's a beautiful weed of wet meadows and, like liatris, makes an excellent cut flower. The long-blooming heavily spired garden varieties are not so apt to jump around, but the woody roots can be difficult to eradicate if clumps get out of bounds. Cultivar differences aren't great, essentially running the gamut of pink. 'Dropmore Purple' is different. 'Happy' is under 2′, the others are 3′ to 4′.

The finest red of any plant native to the cooler reaches of the northern hemisphere is that of cardinal flower (*Lobelia cardinalis*), a short-lived perennial growing to 3′ or 4′ and blooming from mid- to late summer. It is fickle in cultivation, some gardeners succeeding with it for years, but most not, even though cultural conditions may appear identical. Safest procedure: let the seed capsules ripen on the plant and drop their bounty to self-sow, but save a few seeds to grow indoors in the winter. They germinate as easily as marigolds and will flower the first year if started early enough. Don't let plants dry out. Even hammock dwellers will agree that it's worth the work.

An attractive blue-flowered counterpart, *L. siphilitica,* is much easier in cultivation. It is not a striking plant in the

Coneflowers (*Rudbeckia*) and day-lilies are pleasing companions in a summer garden. They require little care for a long display of beauty.

*Roche*

wild but if arranged in fair-sized groups will be a standout in the late summer garden. *L.* x *vedrariensis*, a hybrid between the two cardinal flowers, has vivid purple blossoms and breeds more-or-less true from seed. As might be expected, its garden fickleness is intermediate. All of these lobelias are easy to divide in spring.

A well known fixture of early-summer gardens is *Astilbe* x *arendsii* in its many bright and clear-colored cultivars. Unfortunately, for later bloom we must rely on the raspberry-tinted A. *chinensis pumila*. Plants, however, are nice lacy mat-formers and grow equally well in wet or moderately dry soil. If the muddy 15"-tall spires are sanitized by nearby groups of white-flowered plants, or ones with deep green or silver foliage, they can make a very presentable display in sun or light shade. When this astilbe is planted under a "peegee" hydrangea, both will benefit from the floral contrast. A cultivar worth seeking out is *A. chinensis* 'Finale', which may in fact be a hybrid. It has lighter, clearer pink flowers than *A. c. pumila* and they are borne in large, loose panicles, starting a couple of weeks earlier than the latter, but distinctly after the early-summer astilbes have closed up shop. Do not confuse it with *A.* 'Fanal', a fine early red.

Monkshood (*Aconitum*) is an overlooked perennial despite its substantial height (4' to 6'), but anyone seeing for the first time a well-grown plant with fine blue flowers won't forget it easily. *A. carmichaelii* (mostly *fischeri* of the trade) is sometimes available, as are 'Barker's Variety' and 'Sparks Variety', which are deeper in color. The foliage, which resembles that of a lush, lustrous buttercup, is deeply divided and serves as a good foil for other plants. Garden forms generally benefit from staking. Not surprisingly, some of the monkshoods found in nature are vines.

Late-blooming sorts of lilies deserve a note, though they are not as dependable as many of the early ones. Gold-banded lily (*Lilium auratum platyphyllum*), showy Japanese lily (*L. speciosum*) and Imperial strains are exquisitely handsome and often have intense fragrance. They tend to be short-lived in northern gardens, and the relatively high cost of bulbs makes large plantings unwise. However, if the horticultural budget can make allowance for several bulbs, these stately subjects will bring an extra dimension of beauty to the garden.

From the sublime to what lily fanciers might consider the ridiculous: false-dragonhead (*Physostegia virginiana*) is a useful if somewhat proletarian plant. A member of the Mint Family, it quickly increases from the root and makes its way from yard to yard under (and occasionally over) the fence. Washed-out pink is the common color of the floral spikes, but a

Gottscho-Schleisner

Garlic chives (*Allium tuberosum*) is one of the most ornamental of all herbs when in flower in August. Height is about 3′. Plants self-sow unless spent flower stalks are removed. Foliage may be cut for kitchen use like chives, but is more pungent.

couple of good cultivars exist—'Bouquet Rose' and 'Summer Snow' (white). Height is about 3′. Best grow just a small clump or two. Plants provide a pleasant relief from yellow daisies and combine well with garlic chives (*Allium tuberosum*), which has very ornamental clusters of starry white flowers.

**Rounding Out The Border**

Plants with a vertical appearance, either of floral or growth habit, lend a touch of elegance to the garden, but their best qualities are brought out when placed behind or beside more rounded types. The latter may have an airy or heavy texture. *Gypsophila paniculata* 'Bristol Fairy', whose white baby's-breath flowers recur if the first wave is cut, and *Limonium tataricum angustifolium* (*dumosum*), one of the perennial lavender statices, are classic light filler materials for mid-border. They need room to spread and are best staked.

The showy stonecrop (*Sedum spectabile*) is a squat, stocky defensive guard in or near the front line of the late summer border. Height and size of flower depend very much on culture. On a city sidewalk, in a planting hole around the base of an aged London plane tree and beset by dogs, fumes and litter, it may grow only 8″ or 10″ tall, with rose-pink flower clusters 3″ across. Although the stonecrop is a succulent, if it is given good garden soil and plenty of moisture, the size of all parts may be 2½ times larger. Part of my garden is a bog in winter, but this very rugged plant doesn't seem to mind marsh-marigold as a companion. Of greater height and with persistent deep pink then copper-brown flowers is *S.* 'Autumn Joy'. It is as indestructible.

Hostas are grown primarily for their bold mounds of foliage, but the flower spikes of several kinds appear in late summer and can be showy. Among the best are *Hosta lancifolia* (small leaves, lavender blossoms), *H. plantaginea* (large foliage with very fragrant, pure white flowers) and hybrids derived in part from them, 'Honeybells' (light lavender) and 'Royal Standard' (nearly pure white). All grow well in light shade, and *H. lancifolia* demands it if the soil is dry.

A good-sized clump or two of *Chelone* and summer phlox gives a tall, rounded appearance and serves as good filler. *Chelone* or turtlehead, may be pink (*C. lyonii*) or white (*C. glabra*). It has few pests and tolerates light shade very well. The out-of-the-ordinary flowers remind one of a small hunch-backed foxglove, and the foliage is a remarkably clean lustrous green. Plants grow 4′ tall and benefit from spring pinching.

Summer phlox (*P. paniculata; decussata* of the trade) tends to be a July bloomer in its old varieties, but new ones often have a repeat period if old flowers are promptly removed. Late-flowering cultivars include 'World Peace' (white) and 'Fall Days' (deep rose). Although large drifts of phlox can be striking,

White turtlehead (*Chelone glabra*) is an unusual moisture-tolerant plant valued for its late bloom. Flowers look like hunch-backed foxglove.

Gottscho-Schleisner

plants are susceptible to mildew as the season progresses and usually require several applications of Benlate or other fungicide to look well. Good aeration helps cut down on mildew, so avoid crowding plants. For the same reason, some people remove every other stem from the base in spring. If low maintenance is the aim, don't make phlox the backbone of the border.

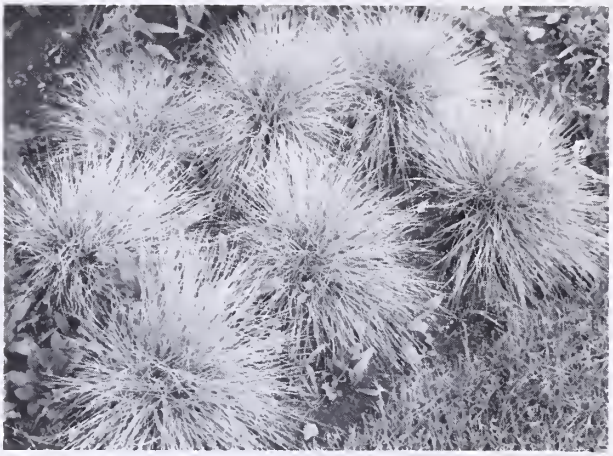
**Cool Front**

The choice of late-summer perennials to face down a border is more limited, but there are some first-rate ones that should not be overlooked. The native fringed bleeding heart often has long bloom and the lacy foliage is continually attractive if plants receive ample water in summer. Botanical name: *Dicentra eximia*. Hybrids or selections of western species with deep pink or reddish flowers, such as 'Bountiful' and 'Luxuriant', are dependable choices for foliage and repeat flowering.

Leadwort (*Ceratostigma plumbaginoides;* formerly *Plumbago larpentae*) has the brightest blue flowers of any late-season, front-of-the-border perennial. The plant makes a good ground cover because it is a rapid spreader, and autumn leaf color rivals a sugar maple. Unfortunately, leadwort is not fully hardy much north of New York City. If a softer blue is desired, choose catmint (*Nepeta* x *faassenii; mussinii* of the trade) and cut it back sharply after the first wave of bloom in June for another display in late summer. The gray-green foliage is cooling on a hot day. It combines well with one of the perennial candytufts, *Iberis sempervirens* 'Autumn Snow'.

A word or two should be given to cushion mums and low-growing asters, both of which are better garden plants than the common taller sorts. The latter are indeed colorful, but they are troublesome for hammock lovers because of their pinching and staking requirements, as well as their penchant for diseases. The best bet is to grow only one or two clumps and to divide them annually—avoiding the temptation to reset all of the divisions. There are many cultivars and a reasonable selection may be seen in most garden centers in late summer.

Tired of standard edging plants? Try the dwarf gray-leaved chive (*Allium senescens glaucum*). A charmer that rock gardeners have appreciated for years, it seldom graces a perennial border. Although the umbels of rosy lilac flowers are very graceful in late summer, resembling an out-of-season thrift, the foliage is the real winner: neat, spirally twisted leaves which are different from anything else in the garden but not so bold as to be always saying, "look at me, look at me!"



Blue fescue (*Festuca ovina glauca*) is a clump-forming ornamental grass with many uses in the garden. It combines well with purple-leaved plants.

*George Taloumis*

Total height when in bloom is only 8".

Finally, don't rely on flowers alone for late summer effect in the garden. Two of the best edging perennials are blue fescue (*Festuca ovina glauca*) and silver mound artemisia (*Artemisia schmidtiana* 'Nana'). Over the years they can provide far greater horticultural pleasure than the most strident phlox or reddest chrysanthemum. Theirs is a quiet charm, a cooling breeze, a note of restraint that tones down the bright colors of August and September. They can also bring out the best in delicate pinks, blues and even white. Their only needs are good drainage and strong light, although I put silver mound artemisia in high shade sometimes and like the resulting informal airiness better than when it is grown as a tight bun in full sun. Experiment with placing these plants in front of selected perennials, and they will give a grace to the garden that few others can.

*Roche*

Silver mound artemisia is one of the choicest foliage plants that can be grown in a sunny, well-drained garden. Texture is soft and feathery, flowers inconspicuous.

# WHAT'S A CULTIVAR, MR. BOLTIVAR?

We're glad you asked the question, Ms. Canthus, because the word appears frequently in this Handbook, and new gardeners as well as some old ones come a cropper on it. Cultivar means a cultivated variety of plant. It is a plant which is different from its parent, and which has been given a fancy name with single quotes around it because of its attributes. The flowers may, for example, be larger or of a deeper color, or there may be more of them per plant.

How does a cultivar come about? Let us say that Herb Mintz, a nurseryman, raises from seeds a thousand plants of the red-flowered bee balm (*Monarda didyma*). Some variability in the offspring can be expected; this is part of nature. One of them might be especially attractive, in Mr. Mintz' view, and different from other bee balms in the trade. Perhaps the petals are ruffled and have a fluffy appearance. He names it *Mondara didyma* 'Fluffy Ruffles', first making sure that no other bec balm has already been given that name. If Mr. Mintz is conscientious and there is a registration authority for the particular plant, he will describe and register it. Unfortunately names such as this often just creep into catalogs with no clear description or note on origins, and they become a source of confusion for gardeners as well as students of plant nomenclature. But that is perhaps another story.

Mr. Mintz knows that 'Fluffy Ruffles', like the great majority of such garden varients, won't breed true from seed (*i.e.*, the offspring of 'Fluffy Ruffles' won't look exactly like 'Fluffy Ruffles'). So, he propagates it by cuttings or division until enough stock has been built up for distribution. Such "vegetative" propagation normally insures that the progeny will be homogenous because it is genetically identical with the parent. It is in fact a clone—an asexually reproduced plant of purportedly good attributes. Other human beings apart from gardeners have recently, with shock, learned the meaning of clone, but we won't go into this here. It is enough to say that gardeners have been cloning *plants* since ancient times.

A cultivar is usually but not always a clone. There are certain groups of plants that breed sufficiently true from seed to be termed cultivars. Many annuals fall into this category thanks to the breeding efforts of the large seed firms. Among perennials, some of the named Shasta daisies, through inbreeding, are examples ('Little Miss Muffet', 'Star of Antwerp'). Uneven seed strains, for example, ones producing a range of flower colors or growth habits, are best not referred to as cultivars.

Cultivars are not always derived from a single species (*e.g.*, *Monarda didyma*), but may be from hybrids of two or more species, as in the complicated case of bearded iris. When the parent plant is a hybrid, all sorts of progeny can be expected. Most will be inferior but, again, one or two seedlings may be meritorious. That is why there are many hundreds of iris cultivars.

Cultivars do not always originate in nurseries, gardens or from breeding prorams. Most species in the wild have a larger degree of variability than is generally recognized. An example is butterfly-weed (*Asclepias tuberosa*), the flowers of which are orange. However, a red- or yellow-flowered variant is occasionally encountered in the wild. If one is especially distinct, it might be vegetatively propagated and ultimately given a fancy name, then distributed.

Cultivars such as these, from a chance find in the wild, are distinct from true botanical varieties. The latter differ in certain constant respects from the species from which they are derived. They are essentially stable, reproduce more-or-less true from seed, and usually occur in a distinct geographical range. They are not given fancy names with single quotes around them, for they have a real botanical rank. An example is the American variety of twinflower (*Linnaea borealis*). Twinflower is native around the world in the cold nordic regions, and botanists

Paul Frese

*Chrysanthemum* 'Granna d'Angelo' (left) is one of the very attractive spoon-type mums. There are countless hundreds of chrysanthemum cultivars. *Phlox* 'Miss Lingard', an old *P. carolina* cultivar, has white flowers and pointed, lustrous green foliage. It starts to bloom several weeks before the onslaught of summer phlox cultivars (*P. paniculata*).

Roche

have given New World plants the name *Linnaea borealis* var. *americana*. In garden writing the "var." is often dropped.

Cultivars of perennials come and go, mostly go, for there has been considerable license in their naming. Many are indistinct or no better than established ones, or true species. As in other areas of human activity, "new" does not necessarily mean "better." In some cases the highly bred cultivars of today are simply not good garden plants despite (in part, because of) capon-size blooms, kaleidoscopic petals or freaky frills.

This should not scare the new gardener unduly, for there have indeed been advances in cultivars, but beware of the name game. Few people can afford to spend $50 or $100 on a new day-lily cultivar, and certainly not if the spouse has just been dissuaded from buying a new coat. Fortunately there are many sound old cultivars available for a dollar or two, and they have proved their worth over the years, or else they wouldn't still be around.

Now, you may not be glad you asked the question, Ms. Canthus, because the answer has not been as simple as you or we anticipated. If we lost you along the way, just substitute "cultivated variety" whenever you see "cultivar." And don't be overly impressed—or intimidated—just because a plant is a cultivar.

# THE AUTUMN GARDEN

Erica Greenfield

The gardening enthusiasm of most people is on the wane after mid-September. The promises of spring and summer have been fulfilled or, if they haven't, it may be time to cut the mistakes, put the garden to sleep and watch football games on Saturday afternoon. Practices vary according to the part of the country—the northerner's interest turning to the pageantry of trees along the roadside, the southerner's to simply getting a cool, restful night's sleep after months of ovenlike heat and humidity.

Some horticultural diehards are not content to let autumn tumble by and slip unnoticed into winter. There may not be compelling reasons except in college towns or parts of the South for an all-fall garden, but there are certainly enough kinds of perennials to stock it, as well as lingering annuals such as calendulas, dahlias, marigolds, snapdragons and ornamental kale. Even if one's garden interest is lagging, it is nice to have a few chrysanthemums for cut flowers and to cushion the descent into winter.

### Chrysanthemums and Asters

The garden chrysanthemum (*C.* x *morifolium*) is of course the Number One autumn flower in the hearts of most people. This is a revered plant in the Orient, where it has been grown and hybridized for some two thousand years, with selections even having been made for culinary purposes. In Japan the chrysanthemum has long been associated with the Emperor, and it, not the rising sun as is commonly supposed, is the emblem of the Japanese flag.

There is a wealth of cultivars to choose from, with every flower color except blue represented. Blossoms come in several types (*e.g.*, pompom, spoon, quill) as well as in varying plant heights. There are also early- and late-blooming kinds, the latter being too tardy for many northern gardens because of hard frost.

Because most chrysanthemums are transient in gardens, a long list of currently popular cultivars is irrelevant. The new grower might best make choices from a good catalog list, ideally after a visit to a botanic garden or garden center with a representative display. In the North, autumn-purchased potted mums have a mediocre survival rate unless placed in a cold frame over winter. The safest course is usually to postpone buying plants until spring or even early summer. Once established in the garden, chrysanthemums can be moved about with ease, even when just coming into flower. This is a point to remember if space is limited and the gardener must use his wits to get the most use out of a small display area.

Many of the fancy or large-flowered kinds of chrysanthemums are unsatisfactory garden plants because of pinching and staking requirements, spray schedules and frequently insufficient hardiness in the North. For these reasons home gardeners have in recent years favored the low growing, so-called cushion mums, which average 15 inches in height and are fairly durable. Although they require no pinching, they should be divided every year or two (with the old center discarded), and attention may need to be given to mildew, aphids and other pests. A winter cover of evergreen boughs also helps. If taller cultivars are required for garden effect or for cutting, a dependable oldtimer such as 'Clara Curtis', a rugged pink-flowered one growing to 4 feet, is preferable to many of the large frilly sorts.

Perennial asters, or Michaelmas daisies as they are often called, provide much the same garden story as chrysanthemums, except the range of flower color is restricted to pink, blue, purple, white and shades thereof. In this respect they complement chrysanthemums well. There are also low-growing cultivars. For some reason, perhaps because wild asters—from which the Michaelmas daisies were derived by hybridizing—are common wildflowers in many parts of North America, the cultivars are not nearly so popular as chrysanthemums. (Selections of golden-

'Mauve Cushion' is one of many perennial aster cultivars. Such low growers, fine for front-of-the-border use, are better garden subjects than the giants of yesteryear. Also known as Michaelmas daisies, they are sometimes prone to mildew, controllable with a fungicide such as Benlate.

Roche

rod have met an even worse fate, compounded by erroneous reports of their hay-fever association.)

As with chrysanthemums, it is best to concentrate on just the cushion-type asters unless height is needed. They need regular division and attention to pests, too. 'Harrington's Pink' is a taller-growing (4 feet) old reliable and does not need to be divided as often, though it may need staking.

A few situations may call for the use of a tall aster relative, *Boltonia asteroides,* with white or purplish blossoms. Its variety *latisquama* has denser flower heads. New York ironweed (*Vernonia noveboracensis*), having deep purple flowers, is an alternative, but gardens with too many plants of this kind become boring as well as a nuisance to maintain. These taller perennials generally look their best in a meadow.

Before turning from the Composite Family, mention should be given to the Nippon daisy (*Chrysanthemum nipponicum*), which is a striking plant in coastal areas. It grows about 3 feet tall and in October bears white flowers resembling Shasta daisies. In cool inland parts of the North frost may blacken it before bloom. The Nippon daisy is essentially woody and can go many years without division, needing no coddling so long as it has full sun and good drainage.

**Other Perennials**

Late-flowering monkshood (*Aconitum carmichaelii; A. fischeri* of gardens) has been discussed elsewhere (p. 17), but it might be spoken of again because of its long bloom period, blue flowers and lustrous foliage, a completely refreshing change from other autumn performers. It is slow to become established and may sulk after division or transplanting but is well worth the effort. Like *Colchicum,* this plant is toxic if eaten and a routine word of caution is in order if you have young children.

Other late-summer bloomers which survive the autumnal equinox well and bloom until mid-fall in some areas are *Sedum* 'Autumn Joy', *S.* 'Indian Chief', *Ceratostigma plumbaginoides* (fine for late leaf color) and some cultivars of *Physostegia virginiana.*

*Cimicifuga simplex,* which bears the inelegant common name of Kamchatka bugbane, is an invaluable autumn bloomer. Flowers resemble glistening white bottle-brushes, and plants grow 3-4 feet tall. Cultivars include 'White Pearl' ('Armleuchter'). A taller, almost stately perennial with similar-type flowers is American burnet (*Sanguisorba canadensis*). Few people grow this fine native, but its horticultural merit has been amply demonstrated at the Smith College Botanical Garden, Northampton, Massachusetts. It can help break up the clutter of

Monkshood (*Aconitum*) is a distinctive perennial for late-summer or autumn bloom. Flowers are usually deep blue or lavender, leaves are shiny, dark green and deeply cleft, similar to but more attractive than buttercup foliage.

*Roche*

tall-growing chrysanthemums and asters and is an appropriate companion for Japanese anemone (*A.* x *hybrida*, formerly *A. japonica* of gardens) in parts of the country where the latter is dependable.

Japanese anemone, of on-again off-again hardiness, is sometimes grown in northern gardens but the best performance is in the mid-Atlantic states, where it thrives in well-drained soils that have been deeply dug with humus. 'Queen Charlotte', with semi-double, dark pink flowers is an old favorite, but there are other cultivars with various shades of pink and white. Grape-leaved anemone (*A. vitifolia* 'Robustissima'), having light pink flowers, is a better garden plant in the cooler reaches.

### Unusual Perennials

Unless we are alpine-plant buffs we don't ordinarily think of gentians as garden plants, but one species, the willow-leaved gentian (*Gentiana asclepiadea*), lends itself to border use. The blue flowers are, well, a good gentian blue and the 3-foot tall plants are undemanding so long as the soil does not become desiccated. Humus helps.

Two collector's items deserve a note. First, *Kirengeshoma palmata* (no common name, sadly) would be an interesting plant if only because of its vaguely maple-like foliage, but a number of delightful nodding yellow flowers appear in autumn. It grows about 4 feet tall and responds to a woodsy soil in light overhead shade. *Kirengeshoma* is highly esteemed in its homeland of Japan, where subtle foliage charm and season-round interest count for more than flamboyant blossoms (except with chrysanthemums, cherries and azaleas).

Toad-lily, an unfortunate common name for *Tricyrtis*, is another overlooked perennial for autumn. There are several species, *T. hirta* being occasionally encountered in American gardens. The white flowers are spotted with purple and are intriguing though not showy. Plants grow about 3 feet tall and benefit from light shade.

The best front-of-the-border plants for autumn performance, apart from cushion mums and asters, are probably *Hosta tardiflora* (inch for floral inch the most floriferous of the lot) and *Liriope muscari* in its multitudinous forms. Most *Liriope* cultivars have navy blue or violet flowers; 'Munro No. 1' is a good white. Some also have gold or white leaf variegation. One

should also consider blue fescue (*Festuca ovina glauca*), for it has subtle charm as the buff seed stalks ripen, and the foliage is always attractive.

The choice of autumn-flowering bulbs for the border is more limited than spring ones. Apart from *Sternbergia lutea*, which has big yellow crocuslike blossoms and foliage at the same time, most of the fall-bloomers are horticultural nudes, which is to say, the leaves appear in spring or early summer, then slowly wither. There is something slightly grotesque about the chrome-lavender autumn-crocus (*Colchicum autumnale*) poking its head above bare soil without pants on. A shroud of silver mound artemisia helps restore decency, but experienced gardeners usually consign autumn-crocus to the meadow. Spider-lily (*Lycoris radiata*), which is only for southern or California gardens, and the hardy-amaryllis (*L. squamigera*) are also nudes, though the latter can be adequately clad with peony foliage, as done at Innisfree, Millbrook, New York.

### Grasses

Few people think of including perennial ornamental grasses in borders. Although they look their best set apart from other plants, some of them can enrich the flower garden, and most are at their prettiest in autumn plumage. In mild climates the stout, tall-growing pampas grass (*Cortaderia selloana*) is striking. A northern counterpart, though not quite so spectacular, is Ravenna grass (*Erianthus ravennae*). Variegated grasses such as striped eulalia (*Miscanthus sinensis* 'Variegatus'), zebra eulalia (*M. s.* 'Zebrinus') and ribbon grass (*Phalaris arundinacea* 'Picta') have a place in the back or middle of the border if the plants in front are distinctly lower or if their foliage has been cut back. It is also wise to spade around the ribbon grass each spring because this runner doesn't know its place.

White-and-green grasses for the front of the border include one of the bulbous oats, *Arrhenatherum elatius* '*Variegatum*', *Molinea caerulea* 'Variegata' and *Carex morrowii* 'Variegata', which is actually a sedge.

Gray or bluish foliage is appreciated for contrast in the garden. The low-growing blue fescue (*Festuca ovina glauca*) has already been mentioned. A taller version of it, useful for midborder or as an accent, is *Helictotrichon* (*Avena*) *sempervirens*. Blue wild rye (*Elymus glaucus*), while coarser, serves the same purpose. It may need occasional trenching for restraint.

Ornamental grasses offer many possibilities for fresh landscape use, and discerning gardeners who want a change of pace from run-of-the-mill perennials are beginning to discover them. Perhaps no sight at the Brooklyn Botanic Garden in October or November, a time when flower borders are on the wane, is more stimulating than the ornamental grass border.

Gardens, especially ones of perennials, are not isolated units, and many structural and seasonal factors must be taken into account if they are to succeed and be a living part of the landscape. Are there, for example, low-growing trees nearby which will enhance the autumn border with their own pageantry? Flowering dogwood, sourwood and Japanese maple might come to mind, or shrubs with vivid fall color such as chokeberry, (*Aronia*), *Photinia villosa* or cut-leaved staghorn sumac. Some have handsome fruits, and these should be considered, too, as well as broad-leaved evergreens.

Finally, because it is so apt to be forgotten at other times of year, the intensity of autumn light should be carefully considered when siting a border or selecting plants. Flower color is more vibrant in autumn, partly because of the tendency of fall-bloomers to have bright colors, but also because of the clarity of the atmosphere and the lower angle of the sun. Shady areas seem more somber than in July or August, and sunny ones are crystal. (White flowers will sparkle in the subdued parts of the garden, dark ones in the sun.) In the late afternoon, colors become almost artificially intense, as if seen through a lens, and backlighting effects may be spectacular. It is in many ways the best time of year to experiment with the subtle placement of plants and gardens.

*Multiplying is for plants as well as rabbits . . .*

# HOW TO INCREASE YOUR PERENNIALS

Paul E. Rogers

Plant propagation is one of the most mystifying, fascinating and satisfying aspects of a gardener's activities. There is something inherently appealing to most people in being able to take some seeds or a single plant, and either by sowing the seeds or by making successive crops of cuttings or divisions to end up with literally a limitless number of plants. All that is needed is the interest, energy and some know-how.

There are a number of reasons why you should be interested in reproducing plants. (1) Supplies of unusual or favored plants can be increased at little or no expense. (2) It is a convenient means of acquiring plants ordinarily unavailable through commercial sources. (3) Unique plant characteristics can be saved, enhanced and perpetuated. (4) Last, first, and most important—it's an enjoyable, intriguing and gratifying experience!

Plant propagation is generally divided into two main categories: sexual—by seed—involving the union of two parents and two "blood" lines; and asexual—by utilizing a vegetative part of a plant to reproduce in its offspring the exact characteristics of a single parent. Division, layering and shoot or root cuttings are the most commonly used means of vegetative reproduction.

### Division

What determines which method of propagation will be used? Most perennials can be divided at one time or another, and this is the technique that many gardeners use exclusively. Actually, some perennials, namely asters, chrysanthemums, Shasta daisies and certain other members of the Composite Family, as well as some members of the Mint Family such as bee balm and false-dragonhead, should be divided every year or two for best performance, since their growth is so vigorous that clumps die out in the center from congestion and flowering becomes sparse.

George Taloumis

Perennial asters or Michaelmas daisies are among the easiest plants to divide. In fact, they require such treatment every year or two to be thrifty. If there is a surplus of divisions, give them to a gardening friend, perhaps as a trade.

Anita Sabarese

Fringed bleeding heart (*Dicentra eximia*) is a delightful plant for woodland gardens or shaded borders. It has a long flowering period, with the peak in spring and blossoms continuing intermittently until frost.

Other perennials, including the common bleeding-heart and peonies, thrive for many years without division.

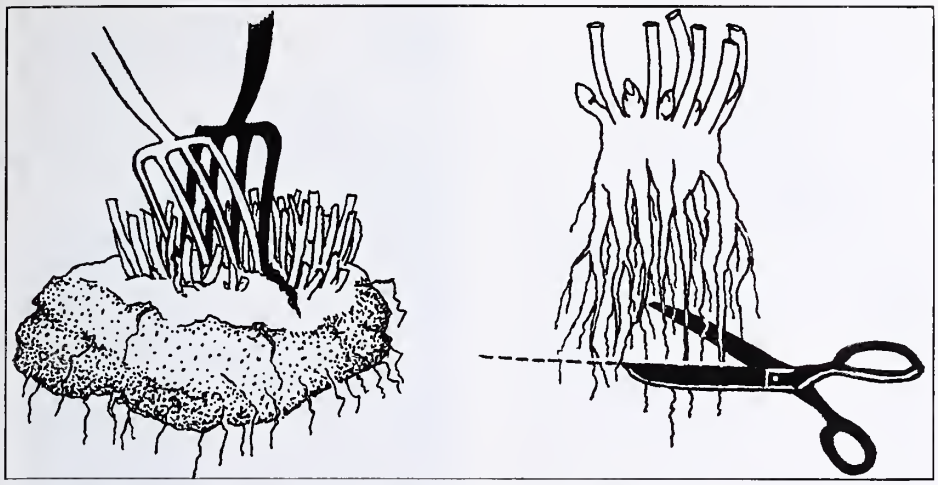
Plants of strong clump-forming perennials are best divided by lifting the clump, inserting two digging forks back to back in the center and firmly prying apart. After the first division, the forks can be reinserted and with less energy the clumps redivided. Obtaining a large number of divisions will of course result in smaller plants for replanting. Discard the old woody centers and replant only strong outer divisions. Before long, you will have enough plants to share or swap with friends.

If an existing clump is fairly small and you want to increase it quickly, a sharp knife comes in handy. Let us say that you have a prized astilbe, a single plant with just five leafy shoots emerging from the soil in early spring. When they are several inches tall, lift the clump and cut sharply down into the sections separating the shoots until they are all severed from the original plant. Each should have as large a piece of the hard, rather woody root attached to it as possible. Presto—five new plants, very small ones which may bloom only sparsely in June or July, but still five new plants! Now, reset them, water them frequently and well, since their moisture requirements are substantial, and give them a feeding every third week with a soluble fertilizer diluted more than the manufacturer recommends. By the latter part of summer these plants may be large enough to redivide, each one yielding two new plants (perhaps three if you have nerves of steel). Considering that the price of a single field-grown clump of a named astilbe in a nursery may be as high as $3, this return of ten new plants in a moderately long growing season is a fine return! Not all gardeners will want to "double divide" plants in this manner because a year's flowering may have to be foregone, but it is a valuable technique to know about.

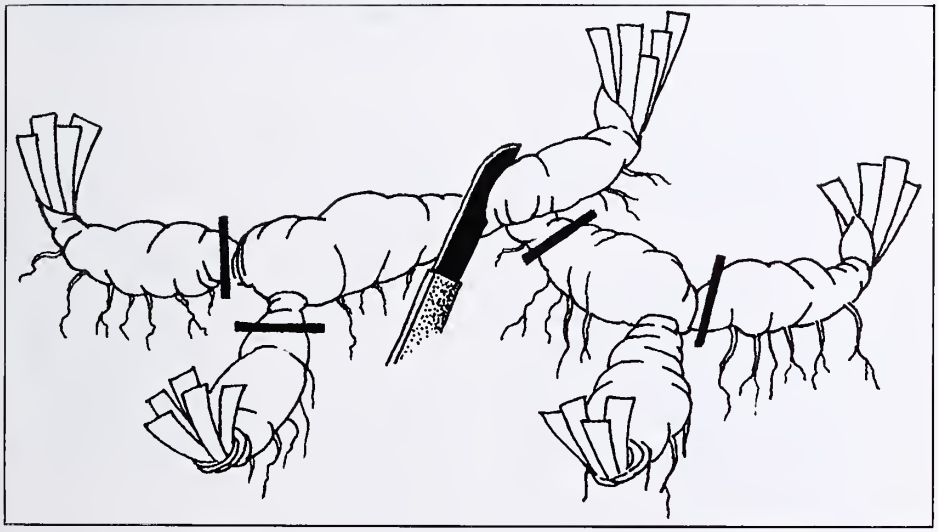
### When to Divide

The general, oft-repeated rule is to divide spring-flowering perennials in autumn and autumn-flowering ones in spring. In practice, if all division is done early enough in spring, those plants that would have been autumn-divided gain an entire growing season and are better able to survive a

Drawings by Eva Melady



The propagation method above is used for many perennials, including day-lilies and Siberian iris. Below: division technique for bearded iris rhizomes.



severe winter by growing all summer. Early-autumn division, except for composites generally, is favored by some gardeners provided it is done at least a month before hard frost, but divisions should be of fair size and mulched well for the winter because they are more susceptible to heaving. Day-lilies, hostas and a few other rugged perennials can be divided almost anytime, but caution is advised in hot, dry weather because it is important for newly divided plants to be well-watered for the first few weeks.

**Layering**

Akin to division is layering, a process whereby plants that root freely at nodal joints have their offshoots separated from the mother plant without it having to be lifted. Many ground covers, including leadwort (*Ceratostigma plumbaginoides*) and some sedums, lend themselves to phenomenal multiplication by surrounding the plants with humusy soil or mulch that stimulates fibrous rooting. A sharp knife to sever the stem between mother and offspring and a trowel to lift the

well-rooted plantlets are all that is required to harvest this bounty.

### Perennials from Seed

As seeding quickly provides quantities of plants, it is the means whereby the commercial grower produces the majority of his plants—and you can, too. Catalog seed offerings will produce quality plants. Home-collected seed gathered from cultivars or hybrid plants may result in seedlings vastly different and often inferior to the parent. In general, only seed from "unimproved" types, *e.g.*, true species, will produce progeny similar to their parents. Some exceptions that breed relatively true are the catalog-offered seed strains of certain hybrid columbines, lupines, Shasta daisies and the bright, June-flowering pyrethrums or painted daisies (*Chrysanthemum coccineum*).

Unfortunately, the suggested time for sowing perennials too often reflects our English gardening heritage and that country's benign climate. Due to our extremes of temperature, seed should be sown by early June in most areas here to develop plants sufficiently strong to survive summer's heat and drought as well as winter's cold and wetness.

Usually, only a limited quantity of each kind of plant is wanted, thus individual azalea pots or bulb pans are used. (Because seedlings are transplanted before extensive root development takes place, only shallow pots are needed.) If you sow thinly, using small seeds, a 5½-inch-wide azalea pot will provide a germination area for two dozen seedlings. A 10-inch bulb pan will allow room for six to eight dozen seedlings.

Rather than taking chances on insect eggs, disease spores and resident weed seeds that may be present in garden-appropriated soil or compost, it is urged that one of the commercially available soilless mediums, *e.g.*, Pro-Mix, Jiffy-Mix, Metro-Mix, be used for seed sowing and transplanting. These formulations containing sphagnum peat moss, perlite, or vermiculite, with lime added to adjust the pH and a dash of slow-release fertilizer to supply basic nutrients, are ideal growth-supportive mediums. Such mixes maximize germination by providing a balance of the twin essentials for growth—excellent aeration and retention of available moisture.

Roche

*Thalictrum aquilegifolium*, a European meadow-rue with airy flowers in spring, is easy to propagate by seed or division.

Put slightly moistened soilless mix in pots, lightly firm it, and place pots into a pail of water until wetness shows on the "soil" surface. The pots are then allowed to drain excess water and settle. Fresh seed is sown thinly on the medium's surface. The seed is not covered deeply, only firmed onto or into the medium, and a wooden plant label, with date of sowing and plant name, is then placed in the side of the pot.

Seedling pots are placed out of the sun in a location safe from accidents and covered first with several folds of newspaper and then overall with a sheet of plastic such as a polyethylene trash bag. The covering excludes light and stabilizes the heat/moisture environment for the seed.

At this time you should remind yourself of two factors concerning the seed. Fresh seed will usually germinate abundantly, and perennial seed, on the average, takes two to four times as long to germinate as annual seed. (Seed that is not fresh may have to be stratified, *i.e.*, given a cold period in a refrigerator for several months.)

Eva Melady

Chrysanthemums need garden renewal every year or two. Some growers like to propagate them by rooting cuttings from new shoots in spring, others prefer to divide plants, resetting only the vigorous offsets.

Seedling pots should be inspected daily for germination. Prepared as suggested, the pots should not require additional water until after sprouting. At the first sign of green, the pot is moved from under the covering to the shade for forty-eight hours. Then it should be able to adjust to full sun and the free movement of fresh air.

From the time seedlings have shown until they are transplanted—an interval varying usually from one to four weeks—they must never dry out. Soaking the pot from the bottom every three to five days should provide adequate water. After true leaves develop, transplant the seedlings to community plant boxes spaced two by two inches or into individual peat pots. These transplants should be grown in good light with free movement of fresh air and weekly feedings of a liquid fertilizer.

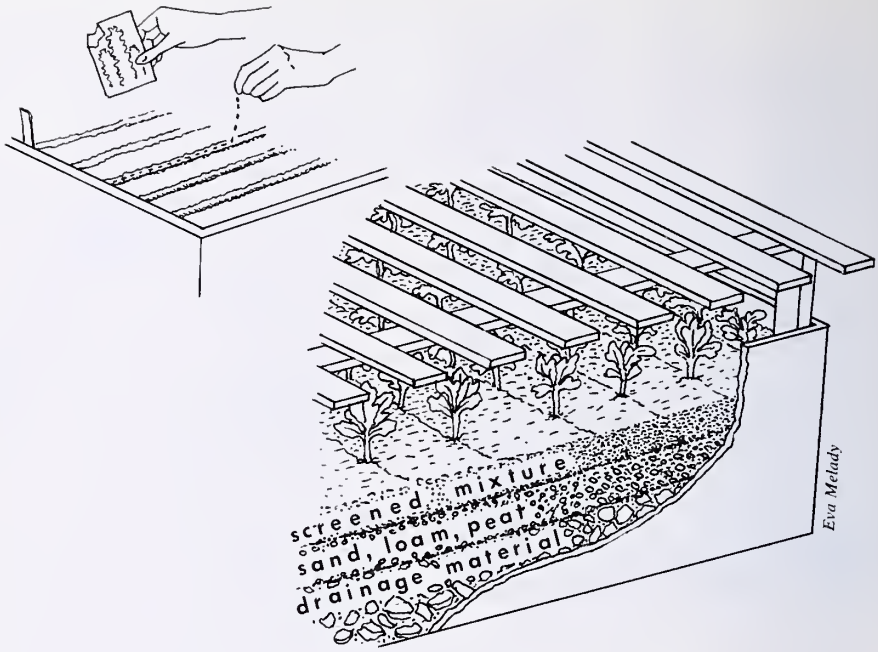
By following this regime you will develop strong stocky plants that can be set out in the garden before a summer shower or in an evening at your convenience. (If you have a cold frame, such plants can be grown on there and held over winter until their final placement in the garden the following spring.) Water the plants in and soak weekly for the remainder of the summer. These plants, given the protection of boughs or mulch, should winter successfully and give you years of beauty.

### Cuttings

There are those perennials that produce no seed or don't come true from seed, or produce all above-ground growth from a single stem and form no offshoots. To increase these plants, cuttings are usually the preferred means of propagation.

It is a fundamental principle that cuttings can be only as good as the plants they came from. Plants affected by viruses or other diseases, insect problems, or physiological disorders of nutrition, water deficiency or weather stress, will not offer an abundant or appropriate supply of quality cuttings.

Cuttings must be in a young vigorous "snap-bean" stage to root well. Too immature a cutting can be bent into a bow without breaking; too old stems will fracture or break jaggedly. The proper growth will snap clean when bent. When in bud or bloom plants provide poor cuttings. Spring-blooming plants produce their best cuttings in midsummer when growth that




Certain perennials are best grown from seed, especially when a number of plants are wanted quickly. Seedlings should never be allowed to dry out completely, but should be kept evenly moist.

developed after flowering has hardened off. Summer- and autumn-flowering plants produce good cuttings in late spring.

As a propagator I prefer clean, coarse sand as a rooting medium, with perlite or vermiculite poor second choices. The roots produced in sand are thicker, stronger and better adjust to planting-out conditions.

Cuttings 2-to-3 inches long are taken in early or mid-morning from a turgid plant. They are dipped in a root-promoting hormone (available at most garden centers) and inserted into the rooting medium. Rooting can occur in bulb pans, 3-inch-deep plant boxes, or in a greenhouse bench. The cuttings are labeled, watered in, and shaded to prevent excessive water stress. They should never be allowed to dry out, yet, should be exposed to all the light they can stand without wilting.

As rooting progresses, new growth appears on the plants. When removing the cuttings from the medium, they should be dug out, never pulled out. Roots should be ⅜-to-½-inch long. The plants may be potted, flatted or set directly into their permanent positions in the garden. Rooting time varies as to the variety, culture and condition of the cutting.

### Root Cuttings

Root cuttings are used most often when a few older plants are all that is available. These plants are dug in the autumn when the roots are at their most vigorous stage. Fleshy roots of pencil-size diameter are removed from the plant, cut into sections 2-to-3 inches long and inserted upright into a growing medium. It makes a difference which part of the root was closest to the plant because this part functions as the top, so when the root is sectioned, the top is cut level and the bottom at a slant for easy identification.

The sections are placed in the rooting mix with the tops an inch below the surface and two inches apart. Rooting will occur in late winter in a greenhouse or in early spring in a cold frame or ground bed. After top growth extends several inches, the plants can be set into permanent garden locations.

## Fifty Perennials to Propagate

(preferred means of propagation indicated in descending order)

| Botanical Name | Common Name | Propagation Methods |
|---|---|---|
| *Achillea* | Yarrow | Seed, division, top cuttings |
| *Aconitum* | Monkshood | Division, seed (not easy) |
| *Anchusa* | Bugloss | Division, seed |
| *Anemone* | Anemone | Seed, division, root cuttings |
| *Anthemis* | Chamomile | Seed, division |
| *Aquilegia* | Columbine | Seed |
| *Artemisia* | Wormwood | Division, seed, top cuttings |
| *Asclepias* | Butterfly-weed | Seed, root cuttings |
| *Aster* | Aster | Cuttings, division |
| *Astilbe* | Astilbe | Division |
| *Baptisia* | False-indigo | Seed, division |
| *Campanula* | Bellflower | Seed, division |
| *Centaurea* | Centaurea | Seed, division |
| *Chrysanthemum* | Fall mum | Division, top cuttings |
| *Cimicifuga* | Snakeroot | Division, seed |
| *Coreopsis* | Tickseed | Seed, division |
| *Delphinium* | Delphinium | Seed, division |
| *Dianthus* | Pink, carnation | Seed, top cuttings |
| *Dicentra* | Bleeding-heart | Division, top & root cuttings |
| *Dictamnus* | Gas-plant | Seed |
| *Doronicum* | Leopard's-bane | Seed, division |
| *Echinops* | Globe-thistle | Division |
| *Epimedium* | Epimedium | Division |
| *Filipendula* | Meadowsweet | Division, seed |
| *Gaillardia* | Gaillardia | Seed, division |
| *Geranium* | Cranesbill | Division, seed |
| *Heliopsis* | Heliopsis | Division, seed |
| *Hemerocallis* | Day-lily | Division |
| *Heuchera* | Coral-bells | Division |
| *Hosta* | Plantain-lily | Division |
| *Iberis* | Perennial candytuft | Seed, top cuttings |
| *Iris* | Iris | Division |
| *Liatris* | Gayfeather | Seed, division |
| *Lupinus* | Lupine | Seed |
| *Lysimachia* | Lysimachia | Layering, division |
| *Monarda* | Bee-balm | Division, seed, top cuttings |
| *Oenothera* | Sundrop | Division, layers |
| *Paeonia* | Peony | Division |
| *Papaver* | Oriental poppy | Seed, root cuttings |
| *Phlox* | Phlox | Division, root cuttings |
| *Platycodon* | Balloon-flower | Seed, division |
| *Primula* | Primrose | Seed, division |
| *Rudbeckia* | Coneflower | Seed, division |
| *Salvia* | Perennial sages | Division, seed |
| *Sedum* | Stonecrops | Division, layering, top cuttings |
| *Stokesia* | Stokes-aster | Seed, division |
| *Thalictrum* | Meadow-rue | Seed, division |
| *Trollius* | Globe-flower | Division |
| *Veronica* | Speedwell | Division, seed |

# PERENNIALS— SPRING TO AUTUMN

George Taloumis

George Taloumis

Leopard's-bane (*Doronicum*) (top) and *Adonis vernalis* (below) have yellow flowers in spring. Delphiniums (right), usually in shades of blue or white, are attractive in early summer. Repeat bloom is common, especially if plants are cut back sharply after the first wave.

Roche

George Taloumis

Japanese anemone (*A.* x *hybrida*) (above) is a pleasant change in autumn gardens from chrysanthemums. Queen-of-the-prairie (*Filipendula rubra*) (below) has airy, soft pink flowers on tall stalks in summer. Martha Washington plume (*F. r.* 'Venusta') has deeper pink flowers.

George Taloumis

Andre Viette

*If you are a very busy person, try . . .*

# EASY GARDENING WITH DAY-LILIES

Andre Viette

An ever-growing number of people consider day-lilies (*Hemerocallis*) to be the perfect perennial. Few plants can rival their beauty and garden durability. Hemerocallis thrive in full sun or light shade, in wet or dry situations, in clay or sandy soil, and they require very little care. These long-lived perennials are also for the most part insect- and disease-free. Most day-lily flowers last only one or two days, which at first glance might seem to be a detriment. It is in fact a wonderful quality. If today's flowers are damaged by insects, wind or a sudden rainstorm, tomorrow is greeted by sparkling fresh new blooms.

Much has happened in the day-lily world since the early hybridizing work of Dr. Arlow B. Stout. The untiring efforts of hundreds of plant breeders have produced the modern day-lily we know today. These newer cultivars come in a wide range of colors (practically all except true blue and true white) and vary in size from miniature 2″ blooms to giant flowers measuring over 7″ in width.

The surface texture of the flower varies greatly from cultivar to cultivar. Some glisten and have a strong luster, while others reflect a waxiness. A satiny sheen is exhibited by some and others are diamond dusted. There are many popular flower shapes from which to choose. Among them are ruffled, reflexed, platelike, round, triangular, piecrusted, spidery and pinched. Some cultivars are evergreen in mild climates.

We can choose from many dwarfs for use in the rock garden or select some of the taller varieties for the herbaceous border. The newer double-flowered daylilies are very popular and add much to brighten the garden with their many-petaled blooms. Tetraploid cultivars with vigorous growth, flowers of greater substance and long bloom period are also gaining favor with gardeners.

### Putting Them to Work for You

Day-lilies have many uses in the landscape. The most common one is in the mixed herbaceous perennial border. There the hemerocallis shares the spotlight with other perennials, as well as with annuals and flowering bulbs. Most cultivars bloom from one month to six

weeks. Some, however, flower continually, and others rebloom after a pause. We can have cultivars for the spring garden, for the June border and for the summer-flowering garden. Finally, we can choose from late-blooming cultivars to add color to the autumn garden. Few plants can give us this wide range of blooming times and require such little care.

Landscape designers have found hemerocallis to be a wonderful plant to use as a ground cover in sunny areas or in light open shade. The more vigorous cultivars are very useful in planting banks for erosion control. Once fully established, a mass planting of them will require little care, for nutritional needs are not high and weeds have difficulty growing among a dense stand. Day-lilies can also complement the tree or shrub plantings along our nation's highways or expressways. They have a special role, too, in beautifying parks, schools and colleges. Day-lilies can add color to office buildings, hospitals, commercial establishments, or virtually any place where low upkeep is essential.

Day-lilies are excellent companion plants and add color to rhododendron and azalea plantings, shrub borders and foundation plantings, especially when these woody plants are not blooming. Today, outdoor living is more important than ever, and entertaining outdoors in the evening with garden lighting is becoming more common each year. The many night-blooming cultivars are ideal to use in lighted entranceways or around terraces. Day-lilies are also adaptable for use in tubs or urns. They can be employed to adorn pools and patios, adding to the enjoyment of any outdoor living area.

There are more than 15,000 different day-lily cultivars, with more being added each year. They vary in color, type and price. Recommended ones will vary from specialist to specialist and from area to area. The following cultivars have done well in our two locations (Long Island, New York and the Shenandoah Valley of Virginia) and other temperate areas of the United States. They are good performers in a price range which most everyone can afford and I feel are destined to remain with us for years to come.

BOLD REDS: 'Admiral Nelson'—Christmas red; 'Anzac'—vivid red; 'Jim

*George Taloumis*

The foliage of day-lilies and peonies go together like love and marriage. Along with hosta, another good companion, these are among the longest lived perennials. All have many fine cultivars.

George Taloumis

Day-lilies have many garden uses. They bloom in light shade and tolerate poor soil, but for the very best performance give them full sun and a deep, humus-rich soil.

Cooper'—flamboyant and fiery vermilion; 'Oriental Ruby'—rich velvety, deep ruby red.

BRILLIANT ORANGES: 'Burning Daylight'—fiery orange; 'Cornwall'—glistening clean orange; 'Frilly Ruffles'—one of the heaviest producers, with tremendous bud count and medium-sized ruffled orange flowers; 'Inca Treasure'—flashy deep orange; 'Lover's Moon'—huge rich gold.

LUSCIOUS PEACHES AND MELONS: 'Fabula'—creamy melon pink; 'La-Louisiane'—one of the best ground-cover types, a good increaser with bountiful melon blooms; 'Western Skies'—elegant melon with fiery orange throat.

REFRESHING RASPBERRIES: 'Hawaiian Punch'—delicious raspberry; 'Rozavel'—wide-petaled raspberry red with glowing throat.

ENCHANTING PINKS AND LAVENDERS: 'Bejeweled'—floriferous, vibrant lavender pink with low-growing habit; 'Catherine Woodberry'—palest lavender and a good grower; 'Dainty Pink'—flesh pink with darker edge; 'Edna Spalding'—small-flowered baby pink; 'Fuchsia Flame'—brilliant fuchsia lavender and extremely sun-resistant; 'Prairie Blue Eyes'—scintillating pale lavender blue with bluish halo.

HANDSOME MAROONS AND BLACKS: 'Buddha'—captivating flat mahogany flower of unusual texture; 'Crawley Crow'—sooty black with velvet texture; 'Derby Bound'—clean purple; 'Shadyside'—plum purple with apricot throat.

SPARKLING YELLOWS: 'Buried Treasure'—ruffled yellow, vigorous and adapted for naturalizing or as ground cover; 'Charbonier'—ruffled, crepe-textured honey-yellow; 'Gold Cap'—plate-like yellow with wide petals, a re-bloomer; 'Limetree'—strong citron yellow flower with lime throat, a compact grower; 'Martin Viette'—palest lemon of medium height; 'Perennial Pleasure'—one of the best yellows; 'Star Dream'—very graceful lemon yellow with lovely fragrance; 'Winning Ways'—an all-time great creamy yellow.

DAINTY MINIATURES AND SMALL-FLOWERED TYPES: 'Bitsey'—repeat bloomer with miniature, lemon yellow flowers on 18" stems; 'Jimmy Fry'—glowing miniature orange; 'Lavaliere'—pleasant pale cream with small flowers; 'Little Grapette'—a plum miniature; 'Little Rainbow'—small-flowered, with many hues; 'Puddin' '—cute yellow miniature; 'Suzy Wong'—floriferous small yellow standout.

DRAMATIC ONES: 'Bold One'—gold background with large wine-purple eye; 'Folklorico'—rich tea-orange edged and striped with yellow; 'Sea Warrior'—ruffled coffee-colored flower; 'Shady Lady'—pale yellow with a magical wine eye zone; 'Thumbprint'—beige background marked with purple-red "thumbprints."

MANY-PETALED DOUBLES: 'Cheek to Cheek'—clean double lemon yellow; 'Double Prize'—enchanting salmon pink double; 'Double Sun'—light green-yellow double; 'Triple Decker'—exceptional double yellow.

Day-lily flowers are available in many colors, sizes and shapes. Some of the newer cultivars are more-or-less everblooming.

*George Taloumis*

TETRAPLOIDS: 'Cherry Cheeks'—intense raspberry; 'Golden Prize'—tremendous crepe-textured orange blooms on compact plants; 'Heavenly Harp'—ruffled creamy yellow and pink blend; 'Holy Grail'—pale creamy yellow with orchid pink midrib; 'Lemon Mint'—ruffled yellow; 'Ruffled Apricot'—beautiful ruffled melon.

NOVEL DWARFS: 'Baby Moon'—creamy golden yellow; round ruffled blooms; 'Little Fairy'—golden orange blooms on short plants, for the rock garden; 'Pixie Face'—golden orange dwarf; 'Raindrops'—miniature dwarf yellow; 'Snoopy'—sparkling yellow dwarf; 'Thumbellina'—small-flowered crisp orange day-lily.

# LILIES

Why not? All have grace, and some are trouble-free. Start with staunchly upright 'Enchantment' (traffic-cop orange) and other rugged Mid-Century hybrids. The Bellingham hybrid strains are dependable, too. There are many others. For fragrance include regal lily (*Lilium regale*) and its hybrids. They rhyme with late June, spoon and moon.

Avoid tiger lily (*L. tigrinum*) and gold-band lily (*L. auratum*) if you grow others. They are virus carriers, the Typhoid Marys of lilydom. Madonna lily (*L. candidum*) is fussy and not for beginners but beautiful in June bloom. It needs shallow planting in late summer. Easter lily (*L. longiflorum*) is hardier than supposed, and bulbs can be wintered outdoors for a few years even in Connecticut. *L. canadense* is a good naturalizer in light shade, though rather slow initially. The same is true of *L. humboldtii* in the West.

Taller lilies need staking. As a rule, they look best individually or in groups of three, especially as focal points in the distance. Try to give them backlighting; red-band lilies treated thus are spectacular.

Autumn is the preferred setting-out time in most localities, though some people like spring better. For fall planting mulch the area ahead of time, since bulbs are sent late and the ground may be frozen. In coldest areas plant in spring. (Bulbs can be overwintered in very lightly moistened peat moss in refrigerator if received too late.) Incorporate superphosphate at planting time, and mulch the site after planting. Good drainage is essential.

Mosaic, a systemic virus, is the main culprit in lily disease. Streaked leaves and stunted growth are symptomatic. Destroy plants; there is no cure. Control aphids, they can spread mosaic. Seed-raised plants are virus-free unless attacked by infested lilies nearby. Many of the taller lilies benefit with protection from afternoon sun, the flowers lasting longer.

*For beauty, durability and minimum maintenance . . .*

# HOSTA, THE DEPENDABLE PERENNIAL

Harold Epstein

A major consideration in landscaping today is low maintenance. The era of skilled or even partially skilled garden assistance is a luxury of the past. Thus, the current surge in horticultural interest is dependent upon the do-it-yourself plan. The result has been that some very learned home gardeners are intent on acquiring more technical knowledge and applying it to their home grounds. This phenomenon is evident in crowded classes in horticulture being offered by botanic gardens, community colleges and adult education centers.

The home gardener with a busy schedule soon learns that the upkeep of a series of traditional flower borders can become an unpleasant chore, at which time interest in plants may lapse. The lesson is to plan on a basic design using plants which require a minimum of manicuring, division, replanting, edging, deadheading, weeding, trimming, pruning and other tasks. In general, a garden that is primarily planted with woody subjects such as azaleas, rhododendrons, ground covers, vines and various deciduous or evergreen shrubs requires far less upkeep than one planted primarily with herbaceous perennials and annuals.

However, a certain number of herbaceous perennials have one or more traits that combine beauty with low maintenance. They may be long lived, grow well under adverse conditions, have decorative foliage and flowers in great variety, be extremely hardy, or thrive in shade. I can think of only one group of plants that has *all* of these praiseworthy traits. This is the genus *Hosta* (previously known as *Funkia*). It is so diverse that specialists have accumulated several hundred species and cultivars, many of them in recent years. Hostas have skyrocketed in favor for many reasons and have been the beneficiary of publicity created by the relatively new American Hosta Society.

Hostas are not a recent discovery. They were associated with the Victorian era of gardening both in England and America. They originated primarily in Japan, but some species are native to China and Korea. Hostas have been grown for centuries in Japan, from where a rather large collection was imported to Holland in 1829-30 by Philipp Franz von Siebold, the plant explorer. The number of species is difficult to determine, for the nomenclature and taxonomy of the plants in cultivation have long been confused, in part because many of the purported species from Japan were in fact cultivars and not known in the wild. Only in recent years have there been serious attempts to unravel the nomenclature, which is still in flux.

A common name for *Hosta* is plantain-lily, which is rather appropriate for it is indeed a member of the Liliaceae and the leaves of some species resemble overgrown plantains. There are a number of old gardens in which edgings and avenues of "plantain-lilies" have not been disturbed for fifty years or more. They are still huge vigorous clumps, blooming reliably each year and smothering all weed competition, and they have not been given much if any attention, including the removal of dead foliage in autumn. Apart from day-lilies and peonies, there are few herbaceous plants that can boast of such durability.

### Uses and Culture

The uses of hostas in gardens are virtually endless. Although they flourish and increase in girth in moist rich soil, hostas tolerate a wide range of growing conditions and are dependable performers even in city gardens. The large robust kinds create superb ground covers under tall deciduous trees or even under dense low-branching conifers, where few other plants can grow. In the latter situation, the reduced light and moisture, as well as severe competition from tree roots, pre-

Roche

Large-leaved hostas present many opportunities for garden use aside for their traditional employment in flower borders; sufficiently rugged to interplant with English ivy.

vent hostas from blooming well, and clumps do not increase quickly in size, but the plants hold their own.

Flowers, which are usually borne on tall stalks, are lily-shaped bells. They come primarily in shades of lilac or lavender, but a few species and cultivars have pure white flowers. The flowering season, depending on variety, is from June to late October. Several hostas are of much floral value apart from the grandeur of their foliage, and one species in particular, *Hosta plantaginea,* is noted for its fragrance.

Hostas may be interplanted among shrubs or used as foreground plantings of herbaceous borders, as edgings for early bulb areas, or as ground covers to suppress growth of weeds. Solitary specimens of large-leaved kinds can make distinguished accents in the garden or by an entryway, and some hostas even lend themselves to container use. Several of the light variegated foliage plants are ideal for shady corners. In all cases discretion should dictate the foliage color and size for the particular use and area.

Diminutive species and cultivars make excellent underplantings for small trees and shrubs. One of the most effective uses I have seen was the solid planting of the small *Hosta venusta,* which has

George Taloumis

Many hostas have variegated foliage. These are ideal to brighten dark corners of a garden.

leaves only four inches long, under the dark red foliage of a horizontally branched, fine-leaved Japanese maple. There are numerous similar opportunities to employ the dainty small species which have only recently come into prominence. They may also be used among astilbes, dwarf ferns, liriopes, primroses, grasses, woodland flowering plants and in corners and pockets of the shady rock garden. The range of color, variegation combinations, splashes, edgings, ribbing and other characteristics in hosta, besides leaf size, shape and structure, is amazing, and the imaginative grower can put these factors to work in a variety of ways.

There are limitations on the use of hostas, though, that gardeners should be aware of. In general, they have a preference for some shade because they are basically woodland plants. Too much sun tends to diminish the luxuriant foliage color, and in many variegated forms the contrast of colors is reduced or lost when in too much sun. Shade for hostas is especially important in mild climates. About the only pest likely to be encountered is the slug, especially on deeply shaded, constantly moist sites. Periodic applications of slug bait may be necessary in such circumstances.

The size and color of hosta foliage will vary depending upon the richness of soil and moisture, and the amount of light. The diminutive cultivars have foliage as small as 2 to 3 inches long, whereas the larger may be up to 18 inches long. Ma-

Hostas are grown mainly for their bold foliage, but the flowers of some kinds are very attractive.

George Taloumis

ture clumps of large varieties can reach 6 feet in diameter. Autumn foliage color is often a rich yellow.

Hostas are easily increased by division in early spring or autumn although it may be sacrificial to disturb an effective mature planting. A less destructive method is to cut out a section or two with a spade (like portions of a pie), filling in the holes with good soil so that a season's new growth will quickly heal the operation.

**Proliferation**

Whereas a dozen years ago a good nursery might list one or two dozen kinds of hosta, the current supply has radically increased. As a result of keen interest in the genus, some new species and cultivars have been imported from Japan and Europe. Energetic amateurs and nurserymen in America have concentrated on the creation of a vast number of new cultivars by hybridizing, inducing mutations and resorting to chemical stimulation for unusual coloring and variation. The genus is renowned for its "immoral" behavior, and natural hybrids too numerous to calculate have evolved. The genus is also inclined to produce mutations, so hundreds of cultivars are being named, many with imperceptible variation in character and color. As in other over-hybridized groups, such as day-lilies and bearded iris, the catalog lists become elongated and high prices for the newest introductions can only be appreciated by the most ardent collectors.

Hostas are perhaps the most unstable herbaceous perennial. Every hundred seeds can produce an equal number of slightly different offspring, so the possibilities for new cultivars are nearly endless. In fact, the only manner of reproducing a true species population from seed is by isolation so that there is no opportunity for cross pollination with another species or cultivar.

In purchasing hosta plants, the ideal procedure is to visit a well-stocked nursery and select the plants that appeal to you for size, color and variety. The foliage appears to be the major consideration to most gardeners, the flowers a secondary one. There are around the country a half-dozen hosta specialists with long catalog lists and a great variety of prices, the highest being for recent introductions. Because of the confusion in hosta nomenclature, seeing and selecting the plants in person is the most desirable purchasing method.

If you require mail-order purchasing, here is a list of nurseries specializing in hostas. Enclose a stamped, self-addressed, business-size envelope. Fairway Gardens, 114 The Fairway, Albert Lea, MN 56007: Garden of Aden, 980 Stanton Avenue, Baldwin, NY 11510: Piedman Gardens, 533 Piedmont Street, Waterbury, CT 06706: Powell's Gardens, Route 2, Box 87, Princeton, NC 27569 (catalog 75¢, includes iris, day-lilies, etc.); Savory's Greenhouses, 5300 Whiting Avenue, Edina, MN 55435.

# HOST A HOSTA TODAY

Despite the wealth of hostas, a few species and cultivars predominate for landscape use. Two of the best for bloom are *Hosta ventricosa* (*caerulea*), which has large leaves and handsome violet flowers, appearing in July, and *H. lancifolia*, with conspicuous lavender blossoms in August and rather small, spear-shaped foliage. *H. tardiflora*, a low, compact grower, is also good. *Hosta fortunei* has sumptuous gray-green leaves and prominent lavender flowers in July. *H. sieboldiana* has particularly attractive glaucous foliage but inconspicuous blooms. *Hosta plantaginea*, the "August-lily," is a striking, fragrant white flowerer with bold foliage.

There is no shortage of hostas with variegated leaves. *Hosta undulata*, a dependable low grower, is the most common, with central white splotches on wavy leaves. *H. crispula* and *H. albomarginata* are less conspicuous in their markings, which are on the leaf margins. A green-and-gold variant is *H.* 'Frances Williams'. *H.* 'Kabitan' is a fine small-leaved sort with a large chartreuse center.

*Anita Sabarese*

Semi-double herbaceous peony

# PEONIES

In cooler parts of the country, what would June be without peonies? Plants are incredibly long lived and have handsome foliage, especially when new shoots appear in spring. They resemble red asparagus then, but the flowers are the main attraction. The big blossoms are white, pink or red, double, semi-double or single, depending on cultivar. Staking is usually required during the relatively brief bloom period. Provide sun, good drainage, enriched soil. Danger: botrytis, a blackening fungal disorder common where air circulation is poor, but which can be controlled by Benlate or other fungicide. Cut foliage to ground in autumn. Best setting-out time: autumn; don't place plants too deep in soil. Botrytis seems less common when peonies are grown as shrubs in turf.

Good cultivars are legion. Try ancient, inexpensive dependables first, then go on to others if your heart dictates and pocketbook allows. Oldies but goodies: *Double-flowered:* White—'Elsa Sass', 'Festiva Maxima', 'Le Cygne'; Pink—'Albert Crousse', 'Alice Harding', 'Mrs. Franklin D. Roosevelt'; Red—'Felix Crousse', 'Karl Rosenfeld', 'Lowell Thomas'. *Single-flowered:* 'Krinkled White', 'Dawn Pink', 'Acturus' (red). *Japanese and anemone types:* 'Ama-no-sode' (pink), 'Mikado' (red), 'Nippon Brilliant'.

Bored with these colors? Try *Paeonia mlokosewitschii,* which is yellow. Don't ask us how to pronounce it. Call it Mollie-the-Witch.

# TALL BEARDED IRIS

Leslie Laking

"Show me a garden in a well-drained sunny spot and I'll show you how to make it an exciting place during late spring." Any irisarian who gardens anywhere in the temperate world could make such a boast quite legitimately. Furthermore, in North America it would doubtless be the queen of all iris—the elegant, colorful, bearded iris—which, in its many cultivars, would be employed. And if the sunny well-drained spot is blessed with medium to light textured soil instead of clay, the task will be that much easier.

At the outset, let me explain that my vantage point for observing these noble plants is the iris garden at the Royal Botanical Gardens, Hamilton, Canada, located at the extreme western tip of Lake Ontario. Here peak bloom for tall bearded iris normally extends from June 5 to 15 in a gardening climate similar to that of upstate New York, a little later than that of most of Ohio and not quite as temperate. Snow cover is unreliable; alternate freezing and thawing in winter is a hazard with which we and other northern gardeners must contend.

This garden, begun in 1947, was acclaimed as one of the great iris gardens of North America as early as 1955, when it served as a focal point for the annual meeting of the American Iris Society held in Hamilton that year. Through the interest of friends within AIS and the Canadian Iris Society, the collection is updated annually.

Public focus at the Royal Botanical Gardens shifts in springtime from lilacs in the Arboretum in late May to iris and peonies in the Spring Garden during the first half of June. This garden has kept a magnificent, ever-changing display of iris before the public of southern Ontario and visitors from beyond for more than a quarter century and provides unlimited avenues for cooperation in projects on the part of the Canadian Iris Society.

### The Growth Cycle

Any plant worth growing is worth growing well. To achieve excellence it is helpful to know something about growth habits of the particular plants concerned. With tall bearded iris, the rhizome is the all-important structure. This is the horizontal, solid storage structure from which the foliage fans and flower stalks arise, and which also bears the roots which feed the rhizome and the plant as a whole.

When an iris plant begins to grow in spring, producing new foliage, it is the stored nutrients in the rhizome which provide the initial impetus. Later, as flower buds begin to appear among the foliage fans, new roots are forming on the rhizome. These roots nourish the plant and are involved in the uptake of nutrients provided in spring fertilizing to enhance the bloom of iris and to aid in the continuing developing new extensions of rhizomes.

After bloom, for a period of four to six weeks, the new rhizome segments continue to develop and store nutrients for next year's spring activity. Flower-bud initiations for the next blooming season, as well as vegetative buds for vegetative increase, develop at this time. The new rhizomes are now well equipped with abundant new roots, and the roots on the old rhizomes degenerate.

By late July in Hamilton the rhizome is usually mature and the plant goes into a period of semi-dormancy, encouraged by summer heat and, frequently, drought. We take advantage of this reduced activity in August, replanting overcrowded clumps and establishing new cultivars.

The lower temperatures and increased rainfall of late summer and autumn encourage new root activity, particularly in that portion of the rhizome close to where the foliage fan originates. New foliage also develops at this time and grows until it is killed by frost here. In milder climates plants may remain green all winter.

### Iris Culture

This sequence can readily be translated into a cultural schedule for tall bearded iris. In early spring, any foliage left on over winter should be removed and de-

Anita Sabarese

Bearded iris (left) rank with the finest flowers of late spring. Many other kinds are grown, including the nearly-indestructible yellow flag (*I. pseudacorus*), which is pretty when naturalized along a brook, as at right.

stroyed to prevent the spread of pests and diseases. As soon as the soil becomes workable, it is time to apply a low-nitrogen, high-phosphorous fertilizer—the kind normally available for vegetables and garden flowers. Unless you have a soil analysis to guide you, you can assume a need for a nitrogen boost in spring. This should be relatively lower than the phosphorus component, however, as provided by a 6-10-6 commercial fertilizer. It should be worked into the soil at the time of the first shallow cultivation. Immediately after bloom and as the spent flower stalks are being removed, good growers usually give another small application of 6-10-6 or similar fertilizer.

For established iris clumps the only other requirement is to insure that there is neither weed competition nor competition from associated plants, because this can cause deterioration more quickly than anything else. Bearded iris resent competition and, for this reason, irisarians often grow their many cultivars in a spot other gardeners might reserve for vegetables.

The water requirement for bearded iris is not great. Adequate moisture up to flowering time and for a month after is important, but becomes less important during the subsequent semi-dormant period. Naturally, watering is required for newly set iris, particularly in late summer when active growth is again in progress. It should be noted that it is much easier to grow iris under deficient moisture conditions than those where the gardener has to contend with excessive moisture and imperfect drainage.

### Planting and Renovating

The time to prepare properly for iris is immediately before planting. This is an opportunity to add the needed organic matter and nutrients and, if renovating old clumps for replanting, some new soil as well. If you have a choice, use loam or sandy loam for your iris planting and make certain that there is plenty of sunlight and good drainage. If the soil is dry, water a day or two before you start. Add organic matter in the form of well-decomposed compost or horticultural peat, or a combination of both with an application of commercial fertilizer higher in phosphorus than nitrogen. Work this well into the planting area, firm lightly and plant.

If you are setting out new iris, these will likely be single rhizomes with one foliage fan or perhaps with twin fans. If roots are long and straggly, cut off to 4 or 5 inches. To reduce the chance of wind loosening the plant, trim foliage back if longer than 10 inches. Individual iris cultivars should be planted 24-30 inches apart to allow space for increase.

The actual planting technique is simple if you make two slanting cuts with a spade, removing a wedge of soil on each side and leaving a ridge of soil between. Set the rhizome on the ridge separating

Paul Freve

the roots so that some will fall on one side, and some on the other side of the ridge. Adjust the rhizome so that it will not be buried, rather just slightly covered with soil when planting is complete. Replace the soil in the wedges created and firm with your boot. The iris is duly planted and with adequate moisture and sunshine should begin growing within two weeks. Plants should bloom the following season, but in our experience only about fifty percent flower the first year.

When a clump of iris has been in one place for four to five years, it will show signs of decline. The rhizomes will be a tangled mass, the center of the clump usually short of bloom. This is your signal to renovate. Lift the entire clump, reserving the strong outer rhizomes with good foliage fans for replanting. Break these into single rhizomes with one or no more than twin fans, cutting off old rhizomes with degenerate roots and discarding old rhizomes with flower stalks. Reduce the foliage to 8-10 inches in length. If you must replant on the same site, use this opportunity to improve the soil.

In renovating a clump of iris, you usually have ample material to replant. At the Spring Garden we try to achieve a quick effect by using five divisions on rhizomes, planting one in the middle and four on a square, each 8-10 inches from the central plant. The technique of planting is the same as for a single rhizome but obviously a little more complicated to perform.

### Problems with Iris

Since this article is directed mainly to home gardeners who may grow up to a dozen cultivars of iris, pest and disease problems are likely to be less serious than where large quantities are grown. There are two problems, however, with which you should be familiar since either or both can be devastating even in a small planting.

Iris borer is an insect pest, the larva of which enters the foliage fans and feeds on its way down to the rhizome where it gouges out great cavities in the rhizome. Borers leave their mark in the foliage fans and several borers in a clump are capable of destroying it. When the borers are small and feeding on the foliage they are easily controlled by systemic insecticides. In fact, the use of Cygon 2E (dimethoate) has become standard practice with many iris growers, who spray the foliage when 6" high, with a second application about two weeks later as directed, and only of course if state EPA regulations permit.

In a small garden where just a few iris are grown, other control measures for the borer may be sufficient. Once you are familiar with the early watery-looking damage to foliage fans, the small larvae can be eliminated with a little squeeze of the fingers. Also, when renovating iris clumps, you may encounter borer-damaged rhizomes and see the large creamy pink larvae still feeding. This is another opportunity to "do some in." Actually, the most effective means of preventing borers is sanitation. Eggs are laid in late summer on iris foliage and on weeds and other plants in the vicinity. Removal of all iris foliage and nearby weeds after frost in autumn eliminates the

majority of overwintering borer eggs.

The most serious disease problem is bacterial soft rot, for which there is no effective chemical control. Fortunately those who pay attention to good cultural practices are not plagued by this disease, which is capable of transforming rhizomes into a stinking soft rotten mass. Providing plenty of direct sunlight and the best of drainage conditions go a long way towards preventing this problem.

Most iris clumps will be affected to a greater or less degree with summer leaf spot. This fungus disfigures the foliage, contributing to summer foliage dieback, but it does not appear to affect the plants unduly. Diseased summer foliage should be removed, making way for new autumn growth.

Although not the result of the activity of any pest or disease, the effects of adverse winter weather can be just as damaging. At the Royal Botanical Gardens no significant winter losses have been sustained since we started covering iris beds with either unsold or used Christmas trees. These help hold the snow, and when snow is scarce, shade the frozen soil, greatly reducing winter freezing and thawing and the subsequent heaving of iris plants.

**Using Iris**

Although tall bearded iris are not, because of their aversion to competition, ideally suited to growing as companion plants with other herbaceous perennials, problems can be minimized by using them in near-front and mid positions in the flower border. Here they are not so likely to be encroached upon by taller bulky plants. Also, if companions are selected carefully so as to avoid invasive plants, the space initially assigned to clumps of tall bearded iris can be kept free of unwanted close competition.

A good clump of white *Iris* 'Piety' or 'Winter Olympics' associated with a non-invasive plant such as coral bells (*Heuchera sanguinea*) in red or pink can be a lovely sight should they overlap in bloom. In any case coral bells will continue to hold the spotlight long after iris bloom has finished, and it will not interfere with the seasonal cycle of iris. Using iris in near-front or mid position, even though 30 inches tall, need not be construed as poor planning. Only the flower stalks are tall; the main bulk of the plant is only 12-15 inches in height.

I like to see iris combined with such June-flowering plants as the gas plant (*Dictamnus albus*) in its white- or pink-flowered forms, with contrasting rich blue-violet *Campanula glomerata*. Neither of these used as companion plants for iris will encroach on them significantly. (Picture a fine clump of pink *Iris* 'Esther Fay' associated with white gas plant and *Campanula glomerata* in the foreground all in bloom together!)

Bearded iris can be used very effectively with day-lilies in shrub plantings as long as iris are given adequate space. Good cultivars of day-lilies will follow the main blooming period for iris. Shrubs provide the undulating natural background embellished by iris and day-lilies. Our home garden was never lovelier than when the vegetable garden was bordered with a combination of iris, day-lilies and lilies. It remained continuously colorful from early June to early September. None of these plant groups need develop at the expense of another if each has adequate space.

Hybridists are bringing forth quantities of new cultivars each year. Determining which of these will be added to our list of superior iris is one of the interesting tasks of irisarians. The favorites of today may be entirely superseded within a period of five years. Real improvements arise from time to time reflected in beauty of form and color, but the important advancements for home gardeners have to do with garden value. We want iris which grow well, produce plenty of flower stalks which stand well and, above all, we want blooms with presence in the garden.

If you are not acquainted with some of the gems among contemporary tall bearded iris, visit a good public iris garden, the garden of an irisarian or an iris show, sponsored by one of the many regional iris societies. This could be the start of a new interest and certainly your garden will never be the same again!

# PERENNIAL GARDENS TO VISIT IN ENGLAND AND NORTHERN IRELAND

Paul Miles

Paul Miles

Mount Stewart Garden in Northern Ireland is one of many National Trust properties with formal perennial borders.

The following is a list of what I consider to be twelve of the best gardens in the country in which to see perennial plants. It is, however, a personal list and does not include gardens in Scotland.

**The Dell Garden – Bressingham Gardens,** Diss, Norfolk. This was created by Alan Bloom and contains nearly 6,000 species and cultivars of perennial plants. It is open regularly. The idea of "island beds" originated here.

**The Royal Horticultural Society's Garden,** Wisley, Ripley, Surrey. A considerable number of perennial plants are to be found here, particularly in the huge double borders running down from Battleston Hill. The grounds also include trial gardens where perennial and other plants are tested for garden worthiness.

**Wyevale Nurseries,** Kings Acre, Hereford, Herefordshire. An excellent nursery garden with quantities of perennial plants used between shrubs.

**Powis Castle,** near Welshpool, Powys. A National Trust property. On the terraces below the Castle are to be found many good plants chosen to take advantage of the generally mild situation.

**Mount Stewart Garden,** County Down, Northern Ireland, (on east shore of

Strangford Lough, 5 miles SE of Newtownards). National Trust. The gardens were designed by the 7th Marchioness of Londonderry and it is possible to grow many tender plants and shrubs because of the situation of the garden between two sea loughs and their proximity to the Gulf Stream.

**Blickling Hall,** Aylsham, Norfolk. A National Trust property. In the formal garden which dates from the 19th century and was re-designed in 1930 by Mrs. Norah Lindsay, there are four large beds of perennials which are arranged so that they form pyramids when in full height and flower. The perimeter borders also contain a wide range of plants, arranged in pleasing association with each other.

**Lanhydrock,** Bodmin, Cornwall. National Trust. As well as the formal gardens beside the house which were laid out in 1857 by Sir Gilbert Scott, there are several other sections including a circular garden devoted to interesting herbaceous plants set below the woodland garden. Here it is possible to grow agapanthus, crocosmias and the hardier cannas.

**Cliveden,** Maidenhead, Buckinghamshire. National Trust. The gardens are remarkable for their flower borders, great parterre and water garden, as well as their history and architectural features. The herbaceous borders opposite one another on the north side are particularly well planted.

**Great Dixter,** Northiam, Sussex. Once home of Nathaniel Lloyd, a leading authority on topiary, the garden is continued by his son Christopher Lloyd, the well-known horticultural writer.

**Beth Chatto,** White Barn Farm, Elmstead Market, near Colchester, Essex. The garden of Mrs. Chatto has become extended to form a nursery specializing in unusual hardy plants. The site allows plants for dry, gravelly soils to be grown in close association with those for more moist and boggy situations.

**Savill Garden,** Windsor, Berkshire. A leading example of all that is good in twentieth-century planting. Perennials here are used in broad drifts and masses with shrubs and trees.

**Royal Botanic Gardens,** Kew, Richmond, Surrey. Kew Gardens is comprised of several gardens and within their various sections are to be found an enormous range of perennial plants.

# THE REWARDS OF PINCHING

When can pinching be done with desirable results? That depends on how well you know the party, but in the garden it is usually May or early June if you live in the normally cooler parts of the country. Californians and southerners seem to get off to a faster start and pinch earlier. The practice varies according to climate, and no judgment is intended here.

Pinching, as all good gardeners know, is the removal of the tips of the growing shoots of a summer-blooming plant in order to make it branch. Benefits: usually a more compact, floriferous plant; staking can sometimes be avoided this way. Which plants? Chrysanthemums, asters, of course, heleniums and many other potentially lanky composites, physostegia and summer phlox. We know a gardener who shears his ironweed (*Vernonia*) when it is 8 inches tall, and it blooms beautifully in late summer. A second and even a third pinching works well with mums, except cushion types. With mums pinching usually stops in the North by the middle of July.

Don't try to pinch everything in sight. Bee-balm may balk, and lilies will languish. Some plants just do not tolerate this kind of treatment. Also, don't waste your time on the lowly. However, a word of caution: Make sure the stems aren't so tall that they snap back and hit you in the face.

*Cool weather aids . . .*

# PERENNIAL GARDENING IN THE BERKSHIRES

Mary Ann McGourty

People often think of the Berkshire Hills of western New England as a summer cultural center or a place to visit on an autumn foliage tour. To those of us who live in this part of western Massachusetts and northwest Connecticut, it is an area of small towns and farming communities, meandering country roads and stone walls outlining old fields, some now returned to woods. The climate is harsh, but it is a fine place to live year round—and to garden.

This is hill country, and the elevation and prevailing weather patterns give us a climate that is comparable to central Vermont. In our town the yearly mean temperature is a chilly 44°F, and winter temperatures of −20°F are not uncommon. Precipitation is abundant, but sometimes it seems to come all in the winter, as our average annual snowfall is one hundred inches. In some years forsythia is seen to bloom only on the lowest branches, which have been protected by a blanket of snow. Ours is perhaps the only town in Connecticut where eastern flowering dogwood (*Cornus florida*) is *not* native—its buds are usually frozen in a late spring cold spell. Summers are invariably cool, and frequent watering of flower borders is unnecessary provided they have been well mulched.

George Taloumis

Graceful lupines, especially the Russell hybrids, are a welcome feature in cool-climate gardens in late spring. Many flower colors are available.

All this is a far cry from my first gardening experience in New Orleans some years ago, where marigolds are in bloom in April and gardeners wield their trowels 365 days of the year. In the humid flatlands of Louisiana all outdoor tasks must be completed by 9 o'clock in the morning in summer, when the gardener rushes to the haven of an air-conditioned house, and no one's children play out in the noonday sun.

### Good Climate for Perennials

Both of these climatic extremes present unique problems and limitations for the gardener, but it seems to me that the varied terrain of the Berkshires provides a more interesting setting for a garden. And it is an easier part of the country in which to grow many perennials.

The handsome, lichen-dappled stone walls which abound in New England make excellent backdrops for perennial borders if they are suitably located within viewing distance of the house. Most of these walls, however, are of dry construction, *i.e.*, built without mortar, and the crannies and crevices provide perfect lodgings for mice and chipmunks. These rodents, apart from their feeding habits, can severely damage plant roots by undermining a border with a series of tunnels that would rival the New York City subway system. This destructive activity can be discouraged, however, by installing a path about two feet wide between the wall and the back of the border. Covered with a thick layer of sand, perhaps with flat stepping stones settled on top, this open space will also allow better air circulation around the plants and will provide easier access to the rear of the border for maintenance. Another sure-fire way to keep the rodent population under control is to acquire a cat or two.

In the Berkshires we are not safe from a late spring frost until the end of May. The use of a cold frame can be a boon under these circumstances. Annual and perennial seeds started indoors in March or April and then transferred to the frame will get a head start on the short growing season. Perennial seeds can also be sowed directly into it and left in place until the following spring, so that the seedlings will be protected during the first winter before being subjected to the elements. A few semi-hardy plants can be carried over winter in a frame, too. Since a cat will object to wintering over with the plants in the cold frame, a few pellets of rat bait should be sprinkled to deter any mice or chipmunks that happen to forage in the area.

In the Berkshires, where spring is often late and autumn arrives early, it is important to gear the garden toward the warmest months. It may be true that one can view spring bulbs through a window in April or May, but it is certainly more enjoyable to be out in the garden in July or August.

### Good Performers

It is possible to grow a wide assortment of perennials here, from *Achillea* to *Zizia*, but there are some which actually thrive in our cold climate. Lupines, summer phlox and delphiniums languish in the summer heat of a southern garden, but they do well with our measuredly warm days and cool, dewy nights. From mid-June into July, lupines bloom with long spikes in an assortment of red, pink, blue and other hues. Their deeply cut basal leaves are especially striking when highlighted by captured drops of water.

Summer phlox (*P. paniculata*) is a mid-season bloomer, and the flowers range in color from white through pinks and reds to purple, depending on the cultivar. My favorite is 'Sir John Falstaff', a good salmon pink. 'Starfire' is a striking red, and I also like 'Miss Lingard', a white-flowered *P. carolina* cultivar. Phlox is subject to powdery mildew, but this can be kept under control with several seasonal sprayings with a fungicide such as Benlate or Phaltan. The effectiveness of the treatment will be increased if two different fungicides are used in alternate applications. If the spent flower clusters are removed promptly, summer phlox may bring the reward of a second wave of bloom in September.

Hybrid delphiniums are among the showiest flowers in the summer garden, with tall spikes in pale-to-vibrant blues and purples, as well as cool whites. The blue shades are among the purest blues in

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The stately white candles of black snakeroot (*Cimicifuga racemosa*) combine well with delphinium and summer phlox. These are mainstays of a New England perennial garden.

the world. Because of their height, 3-6 feet, most delphiniums must be staked individually, but the plants are worth the extra care they require. A deep moisture-retentive yet well-drained soil is essential for best results, as is the addition of dolomitic limestone to our generally quite acid soil. Delphiniums may also give a September bonus of flowers if they are cut to the ground after the first wave of bloom in late June or July. Plants, however, are not long lived.

Other favorites for early summer bloom are astilbes, regal lily (*Lilium regale*), black snakeroot (*Cimicifuga racemosa*) and *Coreopsis verticillata* 'Golden Showers', the last two of which are effective for at least five weeks. Astilbes, in par-

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Golden-star or green-and-gold (*Chrysogonum virginianum*) blooms nearly all summer. A good frontal plant or ground cover in light shade.

ticular, thrive in our moist, humus-rich soil, and they tolerate light shade beautifully. There are a wealth of fine cultivars in the *arendsii* group, but I am fondest of 'Europa' (carmine pink), 'Peach Blossom' and 'Red Sentinel'. 'White Gloria' and 'Deutschland' are good whites, and 'Fire', which had red flowers, blooms a few weeks later than other *arendsii* selections. Its spires are very attractive in front of the tall white wands of black snakeroot.

### Autumn and Winter

Late-autumn planting or division of perennials is not recommended for our area, although we have sometimes had success in the November planting of durable kinds. In general, perennials planted after mid-September do not have enough time to work their roots down deeply and securely into the soil before the ground freezes, and thus they become more subject to frost heaving. Damage from heaving can be minimized by covering perennial beds, especially newly-planted areas, with evergreen boughs after the ground is well frozen, usually by early December. The boughs remain in place until new growth starts in April.

Once an appreciable snow cover arrives, the garden is more-or-less tucked in for the winter, and we can retire to the fireside to mull over the seed catalogs for next year's garden. Berkshire gardens often suffer less winter injury than gardens farther south, *e.g.*, New York City, because of our reliable snow cover, which average 16 inches on the ground from early January through March. We have had success with reportedly tender plants such as *Haberlea, Ramonda, Begonia evansiana* and hardy-amaryllis *(Lycoris squamigera),* though losses have sometimes occurred with leadwort (*Ceratostigma plumbaginoides*) and *Aster* x *frikartii* 'Wonder of Staffa'. Uncommon perennials which do well are some of the rodgersias, which for some unexplained reason are not often seen in American gardens. Two southern natives, *Chrysogonum virginianum* and *Heuchera villosa,* seem quite content in their foster home in northwest Connecticut. A third southern native, this gardener, thrives here, too.

In the Berkshires, as in New Orleans, gardening is a challenge. Gardening in two extremes of climate has provided the opportunity to experiment with many plants, to find out what their limitations (and ours) are. By not restricting ourselves solely to the old tried-and-true, we have made some fine additions to our garden. There have been some disappointments, to be sure, but they are outweighed by the pleasant surprises. There will always be other plants to try, different growing techniques and new combinations of color and form. And always there will be unanswered questions. That is one of the pleasures of gardening.

# PERENNIALS ON THE MID-ATLANTIC COAST

Pamela J. Harper

My experience of southern gardening has been gained in Tidewater, Virginia, bounded by the James and York rivers, Hampton Roads and the Chesapeake Bay. It is Hardiness Zone 8 (Arnold Arboretum map). In these water-girt surroundings houses rarely have basements, because the water table is too high. The water table, combined with annual rainfall averaging 47 inches, makes root rots a common problem and necessitates raised beds in many gardens, including parts of my own. Moisture-loving plants are no solution because summer may bring a month or more without rain and, with the temperature consistently around 90°F, this constitutes a drought. Nor can tropical plants be grown, for winter temperatures may fall to 4°F, though seldom for long. Pests proliferate in the heat, but in my garden plants must fall by the wayside if they cannot get by without benefit of chemical sprays.

### Special Circumstances

My own garden is not typical of the area in that the soil is sand (clay is more usual) and is deficient in nitrogen, phosphorus and potassium, as well as calcium. The pH is 5.0. Peat is used liberally (up to one-third the total bulk of improved soil), and to each barrow of planting mix I add about 8 ounces each of bonemeal (or rock phosphate), cottonseed meal and woodash or greensand. Of late I have added a cup of gypsum to supply calcium without raising the pH. Recently, since I have had access to a goldmine in the shape of the city's collected and rotted leaves, leaf mold has replaced peat in the planting mix and also as a surface mulch in place of ground pine bark. Already there is a marked improvement in vigor, and it seems likely that fertilizer can in the future be omitted from the planting mix. On sandy soil it may take plants two to three years to become well established. During this time any which languish are helped along with occasional bucketsful of water generously laced with liquid seaweed or fish emulsion. Apart from this no fertilizing is done after planting.

The kind of plant which can be successfully grown is determined as much—and perhaps more—by soil as by climate. The two books which have proved most appropriate to my needs are *Gardening on Sand* and *Seaside Gardening*, both by Christine Kelway, who gardens thousands of miles away in Cornwall, England.

In selecting plants for a given area a good starting point is to look around and see what nature grows. I have a few clumps of cardinal flower (*Lobelia cardinalis*) and its blue counterpart, *L. siphilitica*, but no section of my garden is consistently moist. These plants look much thriftier in a ditch along the road, the former right in the water, the latter one a little higher on the bank. Bee-balm (*Monarda*), also, found the soil here too dry for its liking. *Hibiscus moscheutos* is more adaptable, and I much prefer this five-foot-tall mallow, white with a crimson eye, to the large-flowered hybrids offered by nurseries. If grown in full sun it needs wet soil, but partial shade compensates for the lack of this. The garden forms of *Achillea* thrive in local gardens, on soils both heavy and light, with the same bourgeois sturdiness as does the wild yarrow of field and roadside, but some taller kinds need staking.

American gardeners, making pilgrimages to England, too often think that the horticultural advantage lies entirely on that side of the Atlantic. Read, then, these contrasting reports on butterfly-weed (*Asclepias tuberosa*): "This unreliable plant . . . is not easy to establish—or to keep—but thrives best in deep sandy soil in full sun in sheltered gardens in our warmer counties," writes England's Graham Thomas in *Perennial Garden Plants*. Hear now Robert Hebb in *Low Maintenance Perennials* (a book for American gardeners): "This native Ameri-

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Primroses are valued for long-lasting flowers in late winter and spring. There are many species and seed strains. Plants usually need division every two or three years if they are to give their best.

can is hardy and showy in flower, has a long life, will never outgrow its allotted space, has no insect or disease problems, and once established requires almost no attention." Poor soil it certainly selects, but here in the South it often chooses to grow on the *shady* side of the road in a soil which does not dry out. The orange flower color of butterfly-weed is not easy to fit into the garden. Extremes of mood are expressed by two attractive ways of presenting it. Nature usually cools the vibrancy by dotting odd clumps among the grass of meadow or roadside bank. Artistic gardeners might prefer to mix it with pure red, scarlet, golden yellow and other orange flowers in a mutual flaunting of brilliance, carefully excluding any hint of blue.

*Chrysopsis mariana* was on this plot when I came. It seeds itself around rather too abundantly but is valued for its willingness to grow on unimproved sand, for its healthy clumps of gray-green foliage, and for the massed golden yellow daisies on self-supporting two-foot stems in October. *Eupatorium coelestinum* combined most beautifully with this, the flower color that ageratum-blue which photographs pink, in flat-topped clusters beloved by butterflies, but it spreads too rampantly on sandy soil and I had to get rid of it. False-dragonhead (*Physostegia virginiana*) has the same colonizing tendencies and, disliking the rather harsh pink, I discarded it without compunction. *Oenothera speciosa,* known locally as "primrose," romps along even faster. It is definitely not a plant for the cultivated garden, but the two-inch flowers, white, veined pink, with four heart-shaped petals, have an endearing delicacy and I hope to establish it on the roadside verge to cheer passersby.

Of two alien colonizing plants, one goes, one stays. The lines between categories of plants are not clear cut and, though listed as a shrub in English books, *Clerodendrum bungei* is herbaceous in my garden. Having by August reached two feet in height, it bears large flattish heads of moss-pink flowers, attractive in themselves and often adorned by butterflies, a desirable plant did it not pop up hither and yon so uncontrollably. Greater celandine (*Chelidonium majus*) is related to celandine-poppy (*Stylophorum diphyllum*), and the leaf, though smaller, is identical in shape. It forms low bushlets of knuckled, zig-zag stems, sprinkled through spring and much of summer with bright yellow flowers, pretty in association with the lacecap hydrangea 'Blue Wave', both enjoying afternoon shade. My greater celandine is a double form, notwithstanding which it self-seeds abundantly, but not to the nuisance level. I will list, now, a few of my favorite non-native, non-rampant flowering perennials, in seasonal order.

George Taloumis

Lenten-rose (*Helleborus orientalis*) is winter-hardy in the North, but is most valued in climates where there is a long cool early spring.

***Primula vulgaris* (*acaulis*) hybrids**
ENGLISH PRIMROSE

From one packet of Barnhaven strain "mixed double" seed came a great assortment of flowers—singles, semi-doubles and about one quarter fully double. Some are stemmed, some stemless. They range in color from white through cream, yellow, many shades of pink, lavender and deep velvety purple. Most of the singles have a yellow eye, varying in size, and a few are edged or laced in a paler color. In an east-facing bed, backed by azaleas, they are evergreen, pest-free and (a rare blessing in this garden) unappealing to rabbits. They bloom for longer than anything else in the garden, the first flowers (a white variety) usually open by Christmas. Peak bloom comes in March and April, continuing through May with a spattering still to be found in June. This is my favorite plant, its only shortcoming—if such it is—the need to divide the rapidly increasing clumps every second or third year and to find homes for the many seedlings.

***Iris unguicularis***
ALGERIAN IRIS

Many kinds of iris do well in this sandy soil. This one makes hollow centered, rather untidy clumps of grassy evergreen leaves, often sprawling but upright in some forms. In February or March (earlier in mild winters) come a succession of exquisitely scented flowers, each satiny petal with a feathery gold-centered tongue, much like the reticulata irises. Mauve is the commonest color, but there are several named forms, including a white; deep violet blue 'Mary Barnard' is one of the best. Algerian iris thrives on poor, dry soil and is happy in full sun, but the flowers droop rather quickly on the hot days we often get in February and March, so I like to nestle the clumps at the foot of pines where they get some passing afternoon shade. Every form I have been able to obtain came unscathed through Virginia's coldest winter on record, but a friend in Maryland reported loss of hers that year. This iris does not, as is so often stated, need lime.

***Helleborus orientalis***
LENTEN-ROSE

My plants, seedling selections, usually flower in February, each clump producing two dozen or more 3-inch white and pink, speckled flowers. In shade or part sun and not too dry a soil they make three-foot clumps of glossy leaves, dark green and leathery with toothed edges, of buck-eye size and shape. Abundant self-sown seedlings flower in their third spring. Two winters out of three they are evergreen, dying back in the coldest ones and sometimes, too, in summer drought. They flower here before the Christmas-rose (*H. niger*), which does well enough

Photos, Roche

Two perennials noted for long summer flowering—bee-balm (*Monarda didyma*) (left) and globe thistle (*Echinops*).

but rarely produces a flower before the end of March, spreads less rapidly than the Lenten-rose and needs more moisture.

***Euphorbia epithymoides (polychroma)***
CUSHION SPURGE

Striking indeed in April are the rosettes of sulphur yellow bracts of this spurge. It lacks the subtlety which is my preferred kind of beauty and evokes my admiration rather than affection. Here it is somewhat shrubby and if the old stems are not removed in early spring buds break from them and the bush, usually 18 inches high and 3 feet across, is less compact and shapely. Through summer it is neat and trouble-free, a flush of pink replacing the sulphur yellow. Full sun or part shade serve its needs and it is drought resistant if given a deep soil.

***Dierama pulcherrimum***
FAIRY FISHING RODS

The leaves are stiff and slender blue-green swords about 30 inches high. The popular name perfectly describes the slender, flexible 3-4 foot stems, in June arched at the apex by the weight of several short strings of pendulous pink and white 6-segmented one-inch funnels on stems as fine and strong as florists' wire. A zephyr breath starts them nodding and swaying as if on springs. Strength is combined with grace, and they bend with the storm but neither collapse nor break. Dierama is evergreen here through the average winter but dies back when the temperature falls below 10°F for more than a few days. It needs plenty of sun but the flowers last longer with some passing afternoon shade. It is said not to transplant very well. My plants were grown from seed and flowered in their third year. Seedlings can be set out as close as three inches.

***Belamcanda chinensis***
BLACKBERRY-LILY

This plant scatters its progeny with the same widespread prodigality as the wild cherry and it might come into the "weedy" category were the little seedling fans less easily removed. They transplant well and there is never a shortage of adoptive parents. The 2-to-3-foot central stem, clasped by completely flat "herringbones" of blue-green leaves, branches and zig-zags at the apex, bearing in July clusters of 1½-inch lily-like flowers, typically of a speckled orange apt to clash with other flowers. 'Hello Yellow' is a new, bright yellow kind. Clusters of polished black fruits follow the flowers, giving the plant its common name of blackberry-lily, remaining decorative well into winter. Belamcanda must

have full sun, for if there is shade from any direction it leans towards the light.

***Hemerocallis* hybrids**
DAY-LILIES

Day-lilies are the show-stoppers in June and July, some of them repeating later. We are spoiled by many choices but I remain faithful to the old greeny-yellow 'Hyperion'. There are evergreen day-lilies for the South, but the winter foliage looks tatty and I prefer those which go neatly to rest. Unless one finds time to remove dead flowers each day hemerocallis look slovenly. It would be nice if growers could breed or select for self-shedding flowers.

***Begonia evansiana***
HARDY BEGONIA

Southern gardens are not at their best in August, but towards the end of the month this hardy begonia comes into bloom. The lush angel-wing leaves are red-veined beneath. Pendulous panicles of bloom top foot high stems, wild-rose pink ("petticoat pink" a friend calls them) with a dash of brighter color from the ruby-red petioles. The three-winged, deep pink ovaries of female flowers remain colorful long after the petals fall. This begonia naturalizes by means of little bulbils which form in the leaf axils. It likes fairly shady places and moisture-retentive soil. The white form I crave has thus far eluded me.

***Salvia leucantha***
MEXICAN BUSH-SAGE

Come Labor Day and northerners start to think about winter. In southern gardens there is a resurgence of bloom, and often another flush of growth, when the cooler days of October arrive. This magnificent plant, just hardy in my garden if given a winter mulch, flowers from late September until frost. It makes a 4-foot bush of sturdy, rounded stems, the top half branched and each branch tipped with a 6-inch spike of white sage-like flowers extruded from velvety violet calyces. The flower spikes nod when in bud, stiffening when open. The leaves are 6-inch narrow spears, dark green above, white beneath, and soft to the touch.

The above are grown primarily for flower. The horned-poppy (*Glaucium flavum*) I grow primarily for the winter beauty of its leaves, though it puts on a good display of yellow poppies in June, followed by 1-foot-long sickle-shaped pods. The leaves, divided almost to the base into paired lobes, jaggedly cut and curled, are coated with short white bristles which give it the same frost-rimmed silveriness as some of the Dusty Millers. Through a January of record-breaking cold this was one of the few attractive plants in the garden. Though often described as annual or biennial, my plants are in their fourth year. Numerous seedlings appear (being taprooted, they need transplanting when small), so should the plants prove short-lived all will not be lost.

*Iris pallida* 'Variegata' is another foliage plant, approximately half of each leaf being green, the other half creamy yellow. It is particularly effective when late afternoon sun shines through from behind. I like to combine this with such bright blue flowers as *Veronica* 'Crater Lake Blue'. *Polygonatum falcatum* (*japonicum*) 'Variegatum' is doing quite well in rather dry shade, the leaves brushed with white around the edges. In another local garden with similar soil to mine I admired the leopard plant (*Ligularia tussilaginea* (*kaempferi*) 'Aureo-maculata'). It does not have the jaundiced look of so many plants blotched or smeared with yellow. Rather, the bold, kidney-shaped leaves display with deliberation a yellow coining in sizes from dime to dollar, drawing the eye to shady corners seemingly sun-dappled.

In a short article so many good things have to be omitted. Other perennials which have proved themselves, or show distinct promise, include *Kniphofia*, *Liatris spicata*, *Thermopsis caroliniana*, *Spigelia marilandica*, *Armeria* 'Royal Rose', *Alstroemeria* Ligtu hybrids, *Agapanthus* and *Phlomis tuberosa*. Friends who garden on clay list among their most successful perennials *Rudbeckia* (particularly 'Goldsturm'), *Coreopsis verticillata*, *Lythrum* 'Morden's Pink', *Anemone vitifolia*, *Amsonia tabernaemontana*, *Monarda*, *Stokesia*, *Echinops* 'Taplow Blue' and *Centranthus ruber*.

Roche

Moss-pink (*Phlox subulata*)

# IN THE SOUTHEAST

## J. Leonard Park and Alfred F. Scheider

Gardening with perennials in the Piedmont area of South Carolina is severely restricted by the climatic conditions peculiar to the area. An understanding of the prevailing conditions will be helpful as a guide to performance.

The average annual rainfall is 47.8 inches, with the majority falling during winter and early spring. The wettest month is March, averaging 4.94 inches. Late spring, summer and early autumn tend to produce extended periods of drought, with the driest month, October, averaging 2.5 inches. Temperatures range from an average high in July of 79.6° F to an average low in December of 44.4° F. Temperatures in the 90's and to 100° F are commonplace in June and July, often for days at a time. The prevailing soil is an acid red clay (average pH 5.8), lacking in organic matter and deficient in both phosphorus and potassium.

Gardening is further complicated by severe insect infestations, such as armyworm and scale, and also by the prevalence of nematodes.

The best planting time is autumn, with the average first freeze occurring November 5. Actually the ground often permits planting not only in November and December (the ideal months) but into January as well. The average last frost occurs March 31, and since hot weather follows very rapidly, spring planting is not highly recommended.

Clearly, because of warmer temperatures, spring-blooming perennials come into flower much earlier than they do in northern climates. In many cases, also because of higher temperatures, the blooming period is compressed. For example, moss-pink (*Phlox subulata*), which may provide as much as six weeks of color in cooler parts of the Northeast,

flowers here for only about two weeks.

Many mainstays of northern gardens are disappointments in the Piedmont. Japanese anemone (*A.* x *hybrida; A. japonica* of gardens), as well as various campanulas and delphiniums, cannot successfully be grown. Oriental poppy (*Papaver orientale*) will not do, and while *P. somniferum*, a showy annual relative, will grow well, large plantings of it may earn you a sudden visit from the Federal authorities! Peonies, columbines and hostas are marginally successful depending on culture; they require shade and constant watering. Variegated hostas usually show poor leaf color.

### No Need to Despair

There are a host of familiar perennials which are eminently satisfactory in our area. Thread-leaved coreopsis (*C. verticillata*), with yellow flowers, blooms lavishly throughout the season. Butterfly-weed (*Asclepias tuberosa*), *Hibiscus* 'Southern Belle', tritoma or torch-lily (*Kniphofia*), various yellow coneflowers (*Rudbeckia*) and purple coneflowers (*Echinacea*) flourish in the sun, as do many kinds of *Sedum*. Goldenrods (*Solidago*) and *Heliopsis* also do well in sun. *Potentilla tonguei*, a dainty apricot-flowered trailer, and its cultivar 'Firedance', are splendid performers. Such mainstays of the garden as *Hemerocallis* and bearded iris do as well with us as they do in the North. Each has many cultivars. Lily-of-the-valley (*Convallaria majalis*) will survive and spread if planted in a moist situation and given dense shade, even under oak trees. Clematis, particularly if planted so the soil around its roots is shaded, grows and blooms well, and flowering is earlier than with the same cultivars in the North.

Familiar perennials such as *Stokesia*, loosestrife (*Lythrum*), *Veronica* and blackberry-lily (*Belamcanda*) are equally reliable in the South and North. Rose verbena (*V. canadensis*), a more-or-less trailing perennial that is marginally hardy in the North, is widely and successfully used in our area. Yuccas, some of which survive northern winters in good condition, seem to be better performers here.

Many of the hardy bulbs, daffodils in particular, thrive and bloom year after year, and they naturalize with us. However, tulips produce no more than one year's flowers. Some of the lesser bulbs—certain alliums, *Brodiaea, Ornithogalum* and *Triteleia*—can also be depended upon, but scillas and tuberous florist's anemones cannot be recommended.

All in all, by the careful selection of suitable plants, it is entirely possible to develop a successful perennial garden in the Piedmont, a planting that will provide good color from late winter or early spring through summer and autumn.

Sun-loving *Veronica longifolia* is useful for a deep blue vertical effect in summer. Some veronicas have pink flowers, others white, and plant height ranges from several inches to four feet.

*Roche*

# PERENNIALS IN MISSOURI

## John E. Elsley

The range of perennials which can be successfully grown in Missouri is restricted by our extreme climatic conditions. The performance of such well-known subjects as delphiniums, lupines and phlox is adversely affected by the high temperatures, often accompanied by excessive levels of humidity, which prevail in midsummer. These conditions also encourage mildew and other diseases. Generally, therefore, many of the perennials that are most satisfactory here are ones that reach their floral peak during late spring and early summer or late summer and autumn, periods when at least the night temperatures are more moderate.

Because of the hot summer sun, shade, at least during afternoons, is important for the success of many subjects, especially those with large leaves which would otherwise be vulnerable to scorch. Seasonal variations in rainfall, particularly during summer, highlight the need for some form of irrigation. Also, the best possible ground preparation should be given prior to planting, in part to lessen the dependence on watering. At the same time, most perennials require good drainage, which is largely insured if the soil is initially cultivated to at least 18" in depth. During this preparatory operation naturally heavy soils can be improved by the addition of sand, whereas light soils have their water- and nutrient-holding capacity improved by the addition of organic matter.

The correct application of a surface soil mulch such as leaf mold greatly improves the chances of success. During the summer a mulch will not only help to conserve soil moisture but reduce competition from weeds. Mulches applied after early winter frosts will help to alleviate damage to the roots by alternating freezing and thawing. One should, however, be aware that many perennials are susceptible to crown rots, which are encouraged by excessive moisture, especially during the dormant season. Mulches should therefore be applied and maintained with care, and kept at least a couple of inches from the crown of a plant.

In Missouri, because of the often extremely cold winters and frequent absence of snow cover to prevent roots from heaving, most new perennials are best planted in early spring. This is a safer time than late fall when the predominantly young plants would have to contend with the ensuing winter. Many of the subjects which in milder conditions are considered excellent winter foliage plants generally suffer from winter burn in our area, so evergreen perennials do not have an important role in the garden.

Lily-of-the-valley (*Convallaria majalis*) graces woodland gardens in spring with urn-shaped flowers. A much-loved ground cover.

*Roche*

George Taloumis

Astilbe, with white, pink or red flowers, has lacy foliage which looks well with broad-leaved evergreens. Plants tolerate light shade well.

Included below is a list of superior performers at the Missouri Botanical Garden. It includes not only plants of merit in flower but others which display pleasing form, foliage and fruits.

***Achillea* 'Moonshine'.** A hybrid yarrow with yellow flowers in late spring and summer. Foliage gray-green, feathery. Height: 18". Tolerates full sun.

***Allium giganteum*.** The king of the ornamental onions, with large ball-shaped umbels of lilac-colored flowers on 4'-tall scapes in late spring. Full sun.

***Asclepias tuberosa*.** Butterfly-weed, native here, grows to 3' in height and has bright orange flowers in summer. Established plants are difficult to move because of carrotlike roots. Easily raised from seed. Tolerates sun.

***Astilbe* x *arendsii*.** Most cultivars are about 2' tall in flower. Late spring, early summer. Favorites include 'Red Sentinel' (deep crimson plumes), 'Rhineland' (bright pink). Moisture and semi-shade are needed.

***Belamcanda chinensis*.** Blackberry-lily has 2"-wide orange flowers spotted with red, midsummer. Fruits open to reveal clusters of black seeds. Foliage resembles bearded iris. Height: 3'. Best performance in semi-shade here.

***Brunnera macrophylla* (*Anchusa myosotidiflora*).** Siberian bugloss has blue forget-me-not flowers in spring. Height 12-18". Provide shade and moisture.

***Campanula glomerata* 'Joan Elliott'.** Violet-blue bellflowers borne on 18"-tall stems in late spring, early summer. Full sun.

***Cimicifuga racemosa*.** Black snakeroot, a native, has white, spirelike clusters of flowers on 6-8'-tall stalks in early summer. Stately. Needs light shade.

***Cimicifuga simplex* 'White Pearl'.** Profuse bottlebrush flowers on stalks 3-4' tall, autumn. Shade.

***Convallaria majalis*.** Lily-of-the-valley is a useful low ground cover in shady areas. Several distinct forms are available, including double-flowered and light pink.

Roche

Hardy-amaryllis (*Lycoris squamigera*) has lilac-to-rose flowers on leafless stalks in late summer.

***Dicentra spectabilis.*** The common bleeding-heart, a native of China, grows 2-3′ tall and has rosy-red, lyre-shaped flowers in spring. Sun.

***Dictamnus albus* 'Rubra'.** This cultivar of the gas plant or "burning bush" has rosy purple flowers in late spring. Height: 3′. Sun.

***Echinacea purpurea.*** Purple coneflower is native here. Daisy-like flowers with prominent dark centers in summer. Height: about 3′. Excellent cultivars include 'Robert Bloom' (mauve-crimson), 'White Lustre' (warm white) and 'The King' (deep pink). Sun.

***Echinops* 'Taplow Blue'.** A striking globe thistle, to 5 or 6′, with steel-blue flowers over a long period in summer. Plants have architectural merit. Sun.

***Filipendula hexapetala* 'Flore Pleno'.** This double-flowered dropwort has small, creamy white blossoms on 2′-tall stalks in late spring. Ferny, drought-resistant foliage. Sun. (Some botanists list the species as *F. vulgaris.*)

***Geranium himalayense* (*grandiflorum*).** Abundant violet-blue, attractively veined flowers in late spring. Height: 1′ or more. Full sun.

***Gypsophila paniculata* 'Bristol Fairy'.** A popular double-flowered baby's-breath providing an airy, white mass in the summer garden. Height: about 3′. Full sun.

***Heliopsis helianthoides* (*scabra*) 'Incomparabilis'.** Semi-double yellow daisies over a long period in summer. Height: 3-4′. The species from which this cultivar is derived is native here. Sun.

***Helleborus niger.*** The Christmas-rose blooms here from January to March. Sheltered position needed for the nodding white flowers, which are sometimes marred by winter. Height: 1′. Foliage evergreen. Slow to reestablish once moved (buy container-grown). Provide moist, humus-rich soil in shade.

Roche

*Platycodon,* or balloon flower, in its white-flowered form. Blue is more common, and there is a pink as well. 'Mariesii' is a compact-growing blue sort.

Roche

Delicate and graceful tree peonies, actually shrubs, provide a change of pace from herbaceous kinds. This is 'Gesekei'.

***Hemerocallis.*** There are many excellent day-lily cultivars. Plants shade tolerant, but best flowering occurs in full sun.

***Heuchera sanguinea.*** Several good color forms of coral bells exist (white, pink, red and, of course, coral). Plants are clump formers, 1-2′ tall in bloom, which occurs in late spring and summer. Provide moisture, sun.

***Hosta*** species and cultivars. Most of the standard plantain-lilies of the nursery trade perform surprisingly well in Missouri. They require shade and moisture in summer. A local favorite is *H. plantaginea*, which has fragrant white flowers in late summer. Height: 2½′.

***Iris.*** Bearded types are a familiar sight in gardens here and flower well in spring. There are many cultivars to choose from. Siberian also thrive. Sun.

***Liatris spicata.*** This native gayfeather has erect stems with numerous purple flowers in summer. Height: 3-5′. Foliage grasslike. Sun.

***Liriope muscari.*** Big blue lily-turf is evergreen, grows well in shade, flowers in late summer. Cut old foliage back in early spring. Leaves are deep green, in some cultivars variegated, and resemble straps. Height: 18-24″.

***Lycoris squamigera.*** Hardy-amaryllis, with conspicuous lilac-rose flowers on bare stalks in August, is a bulb that grows about 2′ tall. Foliage appears in spring, then withers. Sun or shade.

***Lysimachia clethroides.*** Gooseneck-loosestrife blooms in summer, with elear white flowers on partly nodding stalks. Height: 3′. Semi-shade, moisture. Requires periodic trenching.

***Lythrum salicaria.*** Purple loosestrife is a summer bloomer growing 2-4′ tall. Good cultivars include 'Morden's Pink' and 'Firecandle'. Needs a moist, sunny position.

***Macleaya (Bocconia) cordata.*** Plume-poppy is grown more for its large, boldly lobed foliage than for bloom. Height: 6-8′. Creamy white flowers and attractive seed pods in summer. Plants need to be curbed occasionally. Semi-shade.

***Oenothera missouriensis.*** Ozark sundrops, with showy yellow flowers 4-5″ across, is native here and should be included on any such list. It is a sprawling, summer-blooming plant seldom more than 1′ tall. Good drainage. Sun.

***Oenothera tetragona.*** Common sundrops grows 2-3′ tall, has attractive yellow flowers in late spring, early summer. Plants are often sold as *O. fruticosa*, another species. There are several good cultivars. Sun, semi-shade.

***Paeonia*** cultivars. Peonies are old favorites here as elsewhere. The *lactiflora* and Saunders hybrids are fine. Spring. Height: 3-4′. Sun, well drained soil.

***Papaver orientale.*** Oriental poppy has many good color selections in addition to the traditional orange. Showy. Spring. Height: 2-4′. Foliage dies after bloom. Sun, well drained soil.

***Physostegia virginiana.*** False-dragonhead or obedient plant (so named because a flower if twisted remains in the same position) is an August bloomer. Flowers are pink to purplish-red, white in some cultivars. Heights: 3-4′. Full sun.

*Platycodon grandiflorus*. Balloon-flower attains a height of 3′ and blooms in summer. Flowers are usually blue, but there are light pink and white cultivars, also dwarfs. Sun.

*Pulmonaria angustifolia*. The cowslip lungwort is a good spring bloomer for a moist, shaded site. Flowers are pink in bud, opening to blue. The elliptic leaves are hairy and green, not spotted as in *P. saccharata*. Height: about 10″. Shade, moisture.

*Pennisetum orientale* (*setaceum*). Feather grass is one of the most decorative grasses, growing 3-4′ tall and bearing attractive rose-to-amethyst flowering culms in summer. Has an airy appearance and is easy to grow. Sun.

*Salvia farinacea*. Mealy sage is frequently grown as an annual in northern gardens, but it is more-or-less perennial here. The blue flower spikes, about 2′ in height, continue most of the summer. Sun.

*Sedum* '**Autumn Joy**' ('**Herbstfreude**'). A tall-growing stonecrop (to 3′) that is striking in the autumn garden because of its large clusters of dark pink flowers, which become deeper in color as the season progresses. Sun or light shade.

*Tovara virginiana* '**Variegata**'. A handsome relative of *Polygonum*, this is an uncommon but choice foliage plant. Height: 2′. It needs shade and moisture.

*Trachystemon orientale*. Another uncommon perennial, this member of the Borage Family is valued for its very large, coarse yet striking foliage. Blue flowers appear in spring. Height: 2′. Shade.

*Tradescantia* x *andersoniana* (**virginiana** of the trade). The hybrid spiderworts are valued mainly for their attractive blue, white or wine-colored flowers, which occur over a long period in summer. There are several named cultivars. Height: 2′. Sun.

# GOOD MARRIAGES

Timid about plant combinations? There is no reason to be, for part of the fun of gardening is experimenting with color and foliage combinations. A few mistakes will be made, but the enterprising grower discovers many aesthetically compatible plant companions this way. There are even synergistic effects. Let these happy partnerships suggest others:

SPRING: Siberian bugloss (*Brunnera macrophylla*), with blue forget-me-not flowers, looks at home with late daffodils or tulips. Interplant hostas or day-lilies with daffodils, since the former will grow and hide the unsightly foliage of the latter as it fades slowly away in early summer. New fern and hosta leaves are beautiful partners. Combine globeflower (*Trollius europaeus* of gardens), having large yellow buttercup flowers, with native columbine (*Aquilegia canadensis*) or its hybrids. Silver mound artemisia (*A. schmidtiana* 'Nana') would complement nearly anything except a giant-sequoia but looks especially fine with pink astilbes.

SUMMER: *Coreopsis lanceolata* or its hybrids, bearing yellow daisies, is pleasant with light blue delphiniums in early summer. So is one of the fleabanes, *Erigeron* 'Foerster's Darling' (bright pink), with a silver-leaved grass, *Helictrotrichon* (*Avena*) *sempervirens*. Interplant the burgundy-colored drumstick allium (*A. sphaerocephalum*) with Shasta daisy 'Alaska'. Try rose campion (*Lychnis coronaria*) with old roses. Plant ligularias or hostas in front of Oriental poppies and common bleeding heart (*Dicentra spectabilis*) to hide their foliage as it withers in summer. The tall white wands of black snakeroot (*Cimicifuga racemosa*) are attractive among summer phlox. In late summer garlic chives (*Allium tuberosum*), bearing white stars, are excellent with false-dragonhead (*Physostegia virginiana* cultivars).

# IN SALT LAKE CITY

## W. Richard Hildreth

Annuals are more popular here, but certain perennials are good performers in our alkaline soils. Among them are Shasta daisies (*Chrysanthemum* x *superbum; C. maximum* of the trade), especially good cultivars being 'Aglaya' and 'Esther Read'. Cranesbills (*Geranium* sp.), purple loosestrife (*Lythrum salicaria* cvs.) false-dragonhead (*Physostegia* cvs.), veronicas, compact basket-of-gold (*Aurinia saxatilis* 'Compacta', formerly *Alyssum saxatile*) and perennial candytuft, especially *Iberis sempervirens* 'Purity', do well here. Low growers include *Achillea tomentosa, Potentilla verna* and selections, *Teucrium chamaedrys* and *Phlox subulata* 'Brilliant'. Asters and summer phlox do not thrive because of our high pH.

Other good plants could be included, too: chrysanthemums, bearded iris, peonies, oriental poppies, penstemons, bleeding heart, coral bells and sedums. Many more would probably prove satisfactory if they were available locally. The leading source in this area is Louise Gardens Nursery, and I would like to acknowledge the assistance of its owner, Mr. Kay B. Freckleton, in compiling this list.

*Roche*

Coral bells (*Heuchera*) is long flowering. Bold maplelike foliage is attractive, especially when small-leaved sedums, thyme and flagstone are nearby.

*Roche*

Perennials can provide a symphony of textures in small spaces. Sedum 'Autumn Joy' (center), cushion aster (left), variegated lamium (front), and hosta (rear), plus Carolina rhododendron and English box to round out the scene.

*The wide range of . . .*

# PERENNIALS IN SOUTHERN CALIFORNIA

Philip E. Chandler

In most of the irrigated portions of southern California's lower elevations some perennial is in flower every day in the year. Particularly is this true from Santa Barbara to Baja, on the coastal side of the desert. Where frost is rare or light and summer nights are cool, seasonal changes are subtle. Growth never stops, only slows from drought or burgeons with copious moisture. Usually the increasing dormancy induced by a long dry season and shortest days is cut short by the first drenching rains of December, then weeks of ceaseless sunshine. Under such conditions non-woody plants with conspicuous flowers or foliage or both can be separated into four categories in terms of their garden use.

The first group consists of plants which are essentially evergreen, especially in the mildest areas, and which are effective in all kinds of gardens; some are winter-flowering. Of the second group, equally useful but mostly less common, a number die to the ground in the winter; others serve as flowering ground covers; again, some flower best with short days, chill nights. Thirdly, there are those (as geraniums and gerberas) best employed without other flowering companions, certainly not as solos in a mixed border. The fourth group, by far the most numerous, offers variable results that the dedicated gardener often finds challenging. A few of these are hard to find. Others are easy but unexciting (for example, seedlings of *Penstemon gloxinoides*). Several require special soil preparation, drainage or the right microclimate. Inadequate dormancy limits the performance of many species in southern California (not only perennials), but here and there they develop bountifully.

## Group One—Basic Perennials

***Agapanthus* hybrids**
LILY-OF-THE-NILE

Evergreen straplike leaves. Flowers medium 18-24", tall to 5'. Some shade is desirable. Effective in large containers or open ground.

***Chrysanthemum* x *superbum* (*maximum* of gardens)**
SHASTA DAISY

Evergreen. Flowers are white, single or double, small to large. Peak is in June, but there are some anytime if spent stems are cut to the ground and plants fed. Sun, part shade. Many cultivars.

***Clivia miniata* and hybrids**

Evergreen broad-strap leaves. Flowers range from orange to near-scarlet, rarely cream or pastel. Peak in February. Full shade only.

***Felicia amelloides (caerulea)***
BLUE-MARGUERITE

Flowers pale to deep blue, with yellow disk. There are endless cultivars, dwarf ones growing to 18", tall ones to 2½'. Best in winter, spring. Sun or part shade. Effective in containers or open ground.

***Hemerocallis* hybrids**
DAY-LILY

Evergreen or partially herbaceous. Flowers are yellow, orange, copper or dusty salmon. Some bloom intermittently all year, but the peak is early summer. Sun, part shade. Herbaceous cultivars are unpopular here.

***Limonium perezii***
STATICE, SEA-LAVENDER

Evergreen and everblooming, with lavender strawlike flowers. Full sun. Best near ocean. Tender.

***Liriope gigantea***
GIANT LILY-TURF

Evergreen, growing to 3'. Grasslike leaves, fountain-form growth habit. Highly architectural. The lavender flowers are inconspicuous in autumn.

***Liriope muscari***
BIG BLUE LILY-TURF

Evergreen, grassy clump to 12". Conspicuous purple-spiked flowers (rarely white) in midsummer. Light shade. Snail-prone.

Big blue lily-turf (*Liriope muscari*) disguises itself as a clump of broad-leaved grass until the spikes of purple flowers appear in late summer.

Roche

***Moraea iridioides (Dietes vegeta)***
SOUTH AFRICAN-IRIS

Leaves are narrow evergreen swords growing to 3′. Flowers white, butterfly-like, on long, wiry stems. Flowers off-and-on all year. Sun, part shade.

***Ophiopogon jaburan***
WHITE MONDO GRASS

Evergreen, forming a dark grassy mound to 12″. Nodding white flowers appear in midsummer, followed by metallic-blue fruit. Best in full shade.

***Tulbaghia violacea***
SOCIETY-GARLIC

Grasslike evergreen leaves to 2′. Lavender flowers are generously produced, April-December. Sun, light shade. Plant is onion-scented on contact.

**Group Two—Useful, Some Scarce, Some Ground Covers**

***Achillea taygetea***

A yarrow with gray-green foliage all year. Cream to pale yellow flowers are borne on 20″ stems, with the peak in late spring, but some repeat bloom occurs through summer and autumn. Needs sun. Scarce.

George Taloumis

Bellflowers, such as the Carpathian bluebell (*Campanula carpatica*), thrive in sun or light shade. Their characteristic lavender-blue (some violet or near-white) flowers and evergreen foliage make them good for creating a visually cooling effect.

George Taloumis

***Ajuga pyramidalis, A. reptans***
BUGLE

Essentially evergreen ground covers for light shade. Bronze-leaved forms most popular. Deep blue flowers in spring.

***Anemone* x *hybrida*** (*japonica, hupehensis japonica* of gardens)
JAPANESE ANEMONE

Evergreen foliage mound to 2′. Pink or white flowers on stems to 4′ appear in late summer, autumn. Light shade. Rampant.

***Anigozanthus flavida***
KANGAROO-PAW

Evergreen, with soft, sword-shaped leaves that are dark green, tipped black. Flowers are furry green, tawny red or yellow on stems to 5′, borne intermittently through the year. Sun, light shade.

If you have a touch of light shade to offer columbines (*Aquilegia*), they will reward you with striking, long-lasting bloom in early summer.

***Aquilegia hybrids***
COLUMBINE

Essentially evergreen unless mildewed. Flowers of various colors, spring. Some shade.

***Aster* x *frikartii***
EVERGREEN CROWN

Prolific lavender daisies from spring to late fall. Sun.

***Campanula* species and cultivars**
BELLFLOWER

Evergreen. Flowers are mostly lavender-blue to violet, rarely near-white. They are mostly ground covers. *C. poscharskyana*, the Serbian bellflower, is rampant. Flowering peak is summer, but some continue to late fall. Sun, light shade.

***Ceratostigma plumbaginoides***
PLUMBAGO OR BLUE LEADWORT

Non-evergreen ground cover. Flowers are vivid blue in summer, autumn. Sun or shade. Invasive. *C. griffithii* is a gray-green to bronze, persistent foliage mound, with steel-blue flowers from spring through fall. *C. willmottianum*, an evergreen subshrub to 4′, has same flowering season, needs cutting back in spring. The last two are scarce in the trade.

Roche

Ever-gray-green foliage and some out-of-season repeat bloom make the Greek yarrow (*Achillea taygetea*) a valuable addition to a sunny garden.

Roche

J. Horace McFarland

Stokes'-aster (*Stokesia laevis*) (left) will flower intermittently all year in California, making it extremely desirable for a sunny site. Garden geranium, such as the rose geranium (*Pelargonium graveolens*), is usually tough and dependable. A wide variety of leaf form, flower size and color, and leaf scent makes it a versatile performer.

***Convolvulus mauretanicus***
GROUND MORNING GLORY

Essentially evergreen, prostrate, growing to 12′. Profuse lavender flowers spring-to-fall. Needs cutting back when rangy. Sun.

***Coreopsis auriculata* 'Nana', *C.* x *grandiflora*, *C. lanceolata*—**dwarf, tall and medium, respectively

The foliage is permanent, the flowers are deep yellow. The first blooms all year, the others in summer. Deadheading is imperative. Sun.

***Francoa ramosa***
MAIDEN'S WREATH

Evergreen, with foliage rosette to 3′ across. Tall spires of white or lavender-pink flowers appear in summer. Needs moisture, shade.

***Gaillardia* hybrids**

Evergreen. Everblooming if deadheaded. Flowers are yellow or red and yellow, single or double. Sun.

***Heuchera* species and hybrids**
CORAL BELLS

Evergreen. Loosely spired flowers are white to red, appearing in spring, summer. Some hybrids make a mound to 3′ across. Sun, light shade.

***Iberis sempervirens***
PERENNIAL CANDYTUFT

Evergreen mound to 12″. Profuse white flowers in winter, spring. It tolerates sun, light shade.

***Iris***

Bearded and other large-flowered ones are best grouped alone. Flowering peak is in spring, but some rebloom. Sun.

***Moraea (Dietes) bicolor***

Evergreen. Soft, sword-shaped leaves to 2′. Flowers are pale yellow, intermittent. Sun.

***Kniphofia (Tritoma)* hybrids**
TORCH-LILY, POKER PLANT

Some are evergreen, others herbaceous. Swordlike leaves. Flowers are in spikes, cream-colored to yellow, orange-red, rust. Dwarf or tall. Some cultivars flower in midwinter, most in spring. Sun.

***Nierembergia scoparia (frutescens)***

Tall cup flower. Semi-herbaceous. White or pale blue flowers in summer, fall. Scarce. *N. hippomanica* 'Purple Robe' has needle-like foliage crowned by a bouquet of purple flowers in June, July. Both need sun.

***Salvia farinacea***
MEALY-CUP SAGE

From a 12″ evergreen crown rise tall-stemmed purple to white flowers. Spring to autumn. Sun, light shade.

***Scabiosa columbaria***
PINCUSHION FLOWER

An evergreen low-spreading mound. It

bears pinkish-orchid to lavender flowers all year if deadheaded. Sun.

***Stokesia laevis (cyanea)***
STOKES'-ASTER

Lush evergreen mound to 2′ or more and across. There are large asterlike lavender flowers intermittently all year. One of the best perennials for sunny sites in Southern California. Scarce.

**Group Three—Effective Massed Alone, Dubious Mixed**

***Begonia* x *digswelliana*, *B.* x *richmondensis***

Both have shining red-green foliage year round, grow 2′ high and across. They are prodigious everbloomers with red to pink flowers. The former is muted, the latter somewhat gaudy. Both are effective in light shade against old brick with lush greenery adjoining. Apoplectic in sun, especially when planted here and there. Need cutting back once or twice a year, copious watering and feeding.

***Bergenia* species**

Fat evergreen leaves make formidable clumps and are home for snails, mildew, mealybug and scale. Popular for lavender-pink flowers in mid-winter. White-flowering forms bloom in spring, summer. Mostly shade.

***Chrysanthemum frutescens***
MARGUERITE

Evergreen, fast-growing, short-lived giant shrubs. Light yellow or white daisy flowers are at their peak in the cool season. Effective massed alone in open ground or very large pots. Needs frequent watering, feeding, deadheading.

***Chrysanthemum* x *morifolium***
GARDEN CHRYSANTHEMUM

Strictly for pots or the cutting garden. Sun.

***Gerbera* hybrids**
TRANSVAAL DAISY

Evergreen, forming mounds of large coarse leaves. The long-stemmed enormous daisy-like flowers are pink, salmon, crimson, scarlet, yellow or white. Best in large containers or in the cutting garden. Early spring to late fall. Sun, part shade.

***Impatiens* species and cultivars**

Evergreen, almost everblooming. Tender, best in light shade, especially in summer, fall.

***Osteospermum* species and cultivars** (some woody shrubs)

Evergreen. Conspicuous flowers in white, lavender, pinkish-purple. Plants are spreading ground covers which need hard cutting back twice a year. Sun.

***Pelargonium***
GARDEN GERANIUM

Evergreen. There are striking cultivars of the three commonly grown species—Martha Washington geranium (*P.* x *domesticum*), bedding geranium (*P.* x *hortorum*) and ivy geranium (*P. peltatum*). The latter two may flower all year if insects are controlled. Martha Washington cultivars are summer bloomers. Effective in pots or massed alone. Small-flowered species are more versatile in landscaping.

**Group Four—For Variable Results**

(Plants with long and definite chilling requirements such as herbaceous peonies, lily-of-the-valley and trollius are virtually impossible.)

*Achillea filipendulina* (sun), *Alstroemeria* (shade), *Armeria* (sun), *Aurinia* (*Alyssum*) *saxatilis* (sun), *Bellis perennis* (shade), *Calceolaria* (shade), *Catananche caerulea* (sun), *Delphinium* (sun), *Dianthus* (sun), *Dicentra eximia* (shade), *Dierama pendulum* (light shade), *Erigeron* (sun), *Echinops ritro* (sun), *Eryngium amethystinum* (sun), *Eupatorium coelestinum* (sun, light shade), *Gaura lindheimeri* (sun), *Geranium* (true cranesbills) (sun, part shade).

Also, *Helenium autumnale* (sun), *Helianthus angustifolius* (sun and moisture or light shade), *Hunnemania fumariaefolia* (sun), *Iris kaempferi* (sun), *I. sibirica* (sun), *Linum flavum* (sun), *L. narbonense* (sun), *Oenothera* (sun), *Oxypetalum caeruleum* (sun), *Penstemon* (sun), *Physostegia virginiana* (sun), *Platycodon grandiflorus* (light shade), *Primula polyantha* (light shade), *Rudbeckia* (sun), *Salvia* (sun), *Scabiosa caucasica* (sun), *Streptocarpus* (shade), *Thalictrum* (light shade), *Tithonia rotundifolia* (sun), *Trachelium caeruleum* (light shade), *Verbascum* (sun), *Verbena* (sun), *Veronica* (sun).

# GROWING PERENNIALS IN THE WET PART OF THE PACIFIC NORTHWEST

Charles H. Potter

Growing most perennials on the west side of the Cascade Mountains in the Pacific Northwest is sheer delight to the gardener, for they do so well. To the rest of the United States, Oregon and Washington are thought to be dripping wet all the time. Not so. In fact, almost every sort of climate from desert to rain forest is found in the northwest corner of the country. And to correct a misconception, Oregon has less annual rainfall than much of New York state. The difference is that the rainfall in Oregon is spread out over more months, generally falling in gentle doses.

Late winter and spring moisture give perennials here a good start. Winters are mild and springs cool. Summers are mostly dry with little rainfall; nights are cool.

The late winter-spring climate promotes early weed growth, especially those eager perennial sorts. Gardeners must necessarily keep on top of weed growth from March on, when primroses and other early perennials are starting to flower. Tardy weeding can soon produce an

If the slugs can be kept at bay, there are few places as the Pacific Northwest so congenial for primroses such as this *Primula japonica*.

*Roche*

Roche

The Shasta daisy (*Chrysanthemum* x *superbum*), which thrives in many northwestern gardens, is actually a hybrid of two European relatives of the field daisy.

overwhelming chore. This requires the gardener to watch for gardening opportunities between showers, and frequent cultivating is necessary.

Old "Ugh," the slug, is out early, too, slithering around the garden, munching on tasty young foliage of favorite plants. Slug control here should consist of almost year-around baiting with proven control materials. All hiding places for slugs should be eliminated in the fall. And unprotected slug bait in the spring will need frequent replenishment as the rains deplete its potency. Use of cover over favorite slug feeding areas is a good idea to reduce the cost of material used.

Another menace—usually appearing on the scene in late May or early June in Oregon and Washington gardens—is the obscure weevil. This ugly insect devours an enormous amount of leaf-food as he dines each night. If he would just eat up an entire leaf at a time, it wouldn't be quite so bad. But no, he fiendishly proceeds around a large number of leaves, notching them as he goes. Pacific Northwest gardeners have learned to start spraying for this pest in late May or early June when the weevil first emerges. Malathion works well as does acephate, provided that all foliage, stems and other plant parts are sprayed well. Extra attention is called for where rhododendrons and azaleas are growing nearby, for weevils love these plants and then move into the perennials. It takes frequent sprayings to keep weevils under control, as well as soil applications in the fall to control weevil grubs.

How the aphids love the cool, moist springs in western Oregon and Washington! It requires constant vigilance here to keep aphids under control. One can have them annihilated one day and the next day new winged arrivals will drift in, ready to start a new dynasty if the gardener is not alert.

White flies dote on some perennials and if there are roses nearby, very likely some of the white fly overpopulation may explode in the direction of certain perennials. Never let them get a foothold. If you do you will have a difficult time getting rid of them. I find Malathion, applied heavily beneath

Foxglove (*Digitalis*) has found the Pacific Northwest so much to its liking, it has naturalized in the forests.

*Neva Maye Harvey*

the foliage, keeps white flies under control, but it must be used often.

Most of the coastal "side" soils of the Pacific Northwest are satisfactory for perennials, although there are pockets which call for amendments of one sort or another. One such area that comes to mind is the sandy soil around Canby, Oregon. It actually drains too fast for many perennials and needs additional humus and organic matter to provide better water retention.

It is possible to grow some of the perennials which like somewhat drier conditions if extra attention is given to good drainage. In extreme cases, tiling or a sublayer of gravel may be necessary, but in general, the addition of sand mixed well into and below the root area is all that is needed. I like planting the perennials that require sharp drainage atop berms (ridges) to insure better drainage and greater air movement to aid the drying process after rains or irrigation. Winter and spring rains leach away some nutrients, calling for additional plant fertilizing in the spring. Judging by some gardens I have seen, I believe that garden "tenders" think that this spring moisture lasts forever. It does not and, moreover, I would guess that the relatively dry summers in the Pacific Northwest call for more attention to watering there than in most parts of the country.

Here are some of the favorite perennials used in Pacific Northwest gardens, each of which does well here.

Foxglove (*Digitalis*), seen naturalized in the forests; *Delphinium*, particularly the Pacific Hybrids; *Iris*, especially the bearded types; lupine (*Lupinus*)—the Russell hybrids are most popular; Shasta daisy (*Chrysanthemum* x *superbum*)—currently popular cultivars here are 'Alaska' (an old one), 'Diener's Double', and 'Little Miss Muffet'; phlox; columbine (*Aquilegia* hybrids); peonies; primroses (*Primula*)—many species used in gardens; pinks and various other *Dianthus;* common bleeding heart (*Dicentra spectabilis*); Michaelmas daisies (*Aster* selections).

Take a second look at these: hollyhocks (most biennial), because of the rust problem; all hostas—they are beautiful, but slugs really dote on them; primroses—although they are on the list of Northwest favorites, keep in mind that obscure weevils and slugs love them, too.

# PERENNIALS IN CENTRAL ALBERTA

Gillian Ford

In a cold climate with dependable snow cover herbaceous perennials can prove a boon to the gardener. Despite winter temperatures that sometimes dip to −40° F and a growing season of only 100-120 frost-free days, many perennials that are hardy in Britain or the eastern United States will grow in central Alberta. In summer, growth is rapid, due to long sunny days—17 hours of daylight in late June, cool nights and adequate rainfall. Winter snowfall is usually sufficient to protect the roots and is often better for plants than the unstable conditions encountered in milder climates where plants may be subject to alternate freezing and thawing. Plants are at their most vulnerable here in the early parts of winter and spring when the weather may be very cold and there is no snow cover. A loose layer of straw or evergreen boughs will give some protection, but this should be removed as growth starts in spring.

Some perennials here are more temperamental than others. It is often difficult to judge between hardiness, cultural problems and a natural tendency of some kinds of plants to be short-lived. Certainly we have problems with summer phlox (*Phlox paniculata*), coral bells (*Heuchera sanguinea*) and bearded iris. Sometimes the very attractive modern cultivars seem to be less hardy than the old-timers. Orange-flowered Oriental poppies, for example, do better than the other colors, and some *Hemerocallis* cultivars have not survived despite the hundred percent reliability of most of them. Although perfectly hardy, most of the autumn-flowering asters do not flower early enough to be worthwhile. Shasta daisy (*Chrysanthemum* x *superbum; C. maximum* of the trade) and its many cultivars are very short-lived and survive only the most favorable winter.

Methods of culture are not much different in central Alberta than elsewhere, a well-drained, moisture-retentive soil being ideal. The toughest plants can be divided anytime and will grow anywhere, but many will require a little more care and attention. Except for spring-flowering subjects, division may be done in early spring as soon as the soil is workable. Another good time for division or transplanting is early September, when the days are getting cooler and there is still sufficient time to allow the roots to become established. To aid snow retention throughout winter we leave the tops on until spring, or at least leave eight inches of stub to help hold the snow. The two exceptions to this procedure are peonies and lilies, whose foliage is cut to the ground and removed to avoid over-wintering botrytis. The most important cleanup is in early spring, when all remaining stubs are cut back and leaves or other covering raked off to prevent crown rot.

From the gardener's point of view, perennials can be divided into two groups. The first consists of the sure-fire, tough space fillers, plants that grow well in most conditions. These are usually easy to propagate and are ideal for providing flower and foliage anywhere from the front border to the back alley. The second group includes the "connoisseur's" plants, which require more in the way of loving care and attention.

### The Dependables

Of the toughies, the peony must be the most widely planted in Edmonton, its only disadvantage being a rather short flowering season. Two very common but invasive plants are the field or ox-eye daisy (*Chrysanthemum leucanthemum*) and peach-leaved bellflower (*Campanula persicifolia*), which has blue or white flowers. More choice, but just as reliable are the lower-growing *Campanula carpatica* and *C. glomerata*. Yarrow (*Achillea millefolium*) has a long flowering season and attractive foliage, particularly

A dependable bloomer, peach-leaved bellflower (*Campanula persicifolia*) has to be watched lest it become a pest. It tolerates light shade as well as sun.

Roche

good if you can obtain a deep pink form instead of the common white. Golden-marguerite (*Anthemis tinctoria*) also has nice ferny foliage.

For early-spring bloom, lungwort (*Pulmonaria*), with blue flowers, is hard to beat. Leopard's bane (*Doronicum caucasicum*), a yellow daisy, is another cheerful spring flower. *Bergenia crassifolia*, which has reddish-pink flowers in spring, is an excellent ground cover because of its thick bold foliage. The common bleeding heart (*Dicentra spectabilis*), with its exotic appearance, is one of the most popular perennials here. Fern-leaved bleeding heart (*D. eximia*), a smaller plant with a much longer flowering period, is also frequently seen. Globe flower (*Trollius europaeus*), a bright yellow or orange, is easy to grow. *T. ledebourii*, with a flatter, more open flower, is a later bloomer.

For summer, *Delphinium* hybrids such as Giant Pacific are spectacular but usually need staking. Sneezeweed (*Achillea ptarmica*) is common, also Maltese Cross (*Lychnis chalcedonica*), *Veronica* and many of the *Hemerocallis* cultivars. Columbine (*Aquilegia*) selections are often short-lived but usually seed themselves around. For fall color gayfeather (*Liatris spicata*) and loosestrife (*Lythrum*) are easy and bright.

### Demanding but Rewarding

Many of the perennials in the second group have special cultural requirements. They may need a peaty soil or love lime; favor moisture, or demand sharp drainage; be difficult to propagate, or resent root disturbance. The larger plants among them can make a good background to a herbaceous border or even substitute for shrubs. Some of these, however, are limited in their growth either by a lack of soil moisture, or, under our conditions of low humidity and unfiltered sunlight, by too great a water loss through their large leaves. They are often plants of woodland, best in dappled shade and with abundant moisture. However, we have to remember never to confuse moist growing conditions with soggy stagnant ones. Many a "hardy" plant has died from sitting in melted snow.

Undoubtedly one of the most spectacular of this group is the blue Himalayan-poppy (*Meconopsis betonicifolia*). This, although hardy, is not easy to grow. It needs moisture and dislikes poor drainage and root disturbance. A fair proportion will not survive the first winter and of those left many will prove monocarpic, that is, will die after flowering. However, what are left will be reliably hardy for many years, and they will provide viable seed for future plantings.

The bog primulas are easy to grow here, given moist conditions. Both *Primula sikkimensis* and *P. florindae* will flourish and self-seed in a peaty semi-shaded position. Many other primulas are hardy, and particularly attractive are the early-flowering ones. English primrose (*P. vulgaris*), cowslip (*P. veris*), *P. denticulata*, *P. auricula* and the polyanthus group are all reliable and not too fussy. They also provide a wide range of color.

Roche

*Achillea millefolium roseum*, a pink form of garden yarrow, has a long flowering season. Plants need yearly division or trenching to keep their place.

The ligularias are spectacular plants. These members of the Composite Family, often with six-foot-high spikes of yellow flowers and large, sometimes palmate leaves, are good as accent plants or at the back of a border. Another good background plant is meadowsweet (*Filipendula ulmaria*), also growing to six feet with luxuriant foliage, white flowers and having a long flowering season. Even more attractive and not as invasive, is the cultivar 'Flore Pleno'. Both ligularias and meadowsweet need a rather moist soil in summer for best performance.

Golden-marguerite (*Anthemis tinctoria*) combines dependability with attractiveness. Foliage of this yellow daisy is pretty in spring, but plants usually need staking in summer.

Roche

Although the spring-flowering gentians are more for the specialist alpine fancier, *Gentiana septemfida* is a good-tempered perennial for midsummer. *G. sino-ornata* and *G. farreri* with their hybrids, in particular 'Susan Jane' and 'Inverleith', make arresting displays of blue in the fall, taking little notice of frost or snow.

Other perennials prefer an open, sunny position with a sandy, well-drained soil. Under these conditions many of our southern Alberta natives, also many of the more robust alpines, make good garden plants. Our native *Pulsatilla*, known in these parts as prairie-crocus (elsewhere as pasqueflower), will wither and fade on clay but is an attractive addition to the spring garden on a sandy soil. Introductions from Europe have a wider range of flower colors and a more upright-facing flower. *Yucca glauca*, one of the plants called Spanish bayonet, although native only in the southernmost part of Alberta, is hardy in Edmonton and will even flower when well established.

Useful for erosion control on sandy soils are sea-holly (*Eryngium maritimum*) and sea-kale (*Crambe maritima*). Both have striking though quite different gray foliage. Dwarf perennials for the front of a sunny border include sandwort (*Arenaria verna, Minuartia verna*), which resembles a moss, maiden pink (*Dianthus deltoides*), snow-in-summer (*Cerastium tomentosum*) and rock sandwort (*Saponaria ocymoides*), a bright pink-flowered trailer with a long bloom season. The pale pink or white *Arabis alpina* is hardy here, but for some reason its near relative *Aubrieta deltoidea* is not.

There are many greatly improved cultivars now available, particularly in Britain. Some may prove to be satisfactory under our conditions, while others are being used in breeding programs using native Alberta species as the local parent. We are happy with the wide variety of herbaceous perennials already growing in this region but are convinced that tremendous advances can be made through judicious hybridizing and selection.

# PERENNIALS FOR VARIOUS PURPOSES

Paul Miles and Frederick McGourty, Jr.

### LONG BLOOM PERIOD

Most perennials flower about three weeks. The following usually bloom at least 45 days.

*Achillea* 'Coronation Gold'
*Achillea filipendulina* 'Gold Plate'
*Anaphalis triplinervis*
*Armeria maritima*
*Astilbe chinensis pumila*
*Brunnera macrophylla* (*Anchusa myosotidiflora*)
*Campanula carpatica*
*Chrysanthemum* x *morifolium*, some cushion types, *e.g.*, 'Baby Tears'
*Chrysanthemum parthenium*
*Chrysogonum virginianum*
*Cimicifuga racemosa*
*Coreopsis auriculata* 'Nana'
*Coreopsis* 'Goldfink'
*Coreopsis* x *grandiflora*
*Dicentra* 'Bountiful'
*Dicentra* 'Luxuriant'
*Dicentra eximia*
*Echinacea* (*Rudbeckia*) *purpurea* cvs.
*Geranium sanguineum prostratum* (*lancastriense*)
*Heliopsis* cvs.
*Lysimachia clethroides*
*Lythrum salicaria* cvs.
*Monarda didyma* cvs.
*Nepeta* x *faassenii* (*mussinii*), if cut back after first wave
*Phlox paniculata* cvs.
*Platycodon grandiflorus*
*Polygonum affine*
*Polygonum amplexicaule* 'Atrosanguineum'
*Rudbeckia fulgida* 'Goldsturm'
*Salvia nemorosa* 'Superba'
*Sedum* 'Autumn Joy'
*Tradescantia* x *andersoniana* (*virginiana* of gardens)

### FOR LOWEST MAINTENANCE

These are durable, rugged perennials with few if any pests. Division is infrequently needed, and none requires staking. Virtually all plants, it should be pointed out, require some attention, contemporary authors notwithstanding.

*Amsonia tabernaemontana*
*Artemisia schmidtiana* 'Nana'
*Aruncus dioicus*
*Asclepias tuberosa*
*Baptisia australis*
*Brunnera macrophylla*
*Chelone glabra*
*Chelone lyonii*
*Cimicifuga simplex*
*Dicentra* sp.
*Dictamnus albus*
*Echinops* 'Taplow Blue'
*Epimedium* sp.
*Eryngium* sp.
*Euphorbia epithymoides* (*polychroma*)
*Filipendula hexapetala* 'Flore Pleno'
*Geranium* sp.
*Hemerocallis* cvs.
*Hosta* sp. & cvs.
*Iris sibirica*
*Lilium* 'Enchantment'
*Rudbeckia fulgida* 'Goldsturm'
*Sedum* 'Autumn Joy'
*Sedum spectabile* cvs.
*Veronica incana*

*Roche*

Hollyhocks (self-seeding biennial)

### FOR SHADED SPOTS

A number of perennials tolerate a degree of shade, relatively few demand it. A light, even, overhead shade, as from trees that have been pruned high, is generally better for plants than a condition of shade in the morning, hot sun in the afternoon, which will induce flowers to bend toward the light. Bear in mind that afternoon sun in many parts of the country is intense, causing certain flower colors to "wash" and bringing about an abbreviation of the bloom period, as well as scorching the foliage of some plants. The following perennials have more than average shade tolerance. Native woodlanders, including ferns, should also be considered.

*Anemone nemorosa*
*Aquilegia,* some
*Aruncus dioicus*
*Aster divaricatus*
*Astilbe,* most
*Begonia evansiana*
*Bergenia* sp.
*Brunnera macrophylla*
*Campanula latifolia*
*Cardiocrinum giganteum*
*Chelone* sp.
*Cimicifuga racemosa*
*Dicentra* sp.
*Epimedium* sp.
*Eupatorium rugosum*
*Euphorbia robbiae*
*Galax urceolata (aphylla)*
*Gentiana asclepiadea*
*Geranium* sp.
*Helleborus* sp.
*Hesperis matronalis*
*Heucherella* cvs.
*Hosta* sp. & cvs.
*Iris foetidissima*
*Lilium,* some, esp. *L. martagon*
*Liriope* sp. & cvs.
*Lobelia cardinalis*
*Lobelia siphilitica*
*Mertensia virginica*
*Myrrhis odorata*
*Ophiopogon* sp.
*Paeonia emodii*
*Phlox,* some
*Polygonatum* sp.
*Primula* sp.
*Pulmonaria* sp.
*Saxifraga fortunei*
*Smilacina racemosa*
*Symphytum grandiflorum*
*Thalictrum* sp.
*Tiarella wherryi*
*Trachystemon orientale*
*Tricyrtis* sp.
*Trollius* sp. & cvs.
*Veratrum* sp.

### FOR MOIST SOILS

The great majority of perennials thrive in well drained soil. Some, however, tolerate or demand a moist condition. Among them are:

*Aruncus dioicus*
*Asperula odorata*
*Aster novae-angliae*
*Astilbe* sp. & cvs.
*Caltha palustris*
*Chelone* sp.
*Cimicifuga racemosa*
*Epimedium* sp. & cvs.
*Filipendula,* most
*Geranium* sp. & cvs.
*Helenium autumnale*
*Helianthus tuberosa*
*Hemerocallis,* durable cvs.
*Hibiscus moscheutos* & hybrids
*Hosta* sp. & cvs.
*Iris kaempferi*
*Iris pseudacorus*
*Iris sibirica*
*Ligularia* sp. & cvs.
*Lobelia cardinalis*
*Lysimachia* sp.
*Lythrum salicaria* cvs.
*Mentha* sp.
*Mertensia virginica*
*Monarda didyma* cvs.
*Myosotis scorpioides*
*Petasites* sp. (invasive)
*Primula japonica*
*Pulmonaria* sp. & cvs.
*Rodgersia* sp.
*Sedum* 'Autumn Joy'
*Sedum spectabile* & cvs.
*Thalictrum* sp.
*Trollius* sp.
*Valeriana officinalis*
*Veratrum* sp.

### FOR DRY SOILS

The following perennials have a fairly wide tolerance of soils but can endure dry conditions better than most. They have a particular role in coastal areas.

*Achillea* sp. & cvs.
*Anaphalis* sp.
*Anthemis tinctoria*
*Arabis* sp.
*Artemisia* sp.
*Asclepias tuberosa*
*Aurinia (Alyssum) saxatilis*
*Campanula persicifolia*
*Catananche caerulea*
*Cerastium* sp. (invasive)
*Crambe* sp.
*Coreopsis* sp.
*Dianthus plumarius*
*Echinacea purpurea*
*Echinops* 'Taplow Blue'
*Eryngium* sp.
*Euphorbia* sp.
*Festuca ovina glauca*
*Gaillardia aristata*
*Gypsophila paniculata*
*Hemerocallis*, durable cvs.
*Iris tectorum*
*Kniphofia* selections
*Lavandula angustifolia*
*Liatris* sp.
*Linum* sp.
*Lychnis* sp.
*Origanum vulgare*
*Potentilla* sp.
*Salvia* sp.
*Santolina* sp.
*Sedums*
*Sempervivums*
*Stachys byzantina (olympica)*
*Tanacetum vulgare crispum*
*Thymus* x *citriodorus*
*Thymus vulgaris*
*Veronica incana*
*Yucca* sp.

### FOR FRAGRANCE

Why has fragrance disappeared from many perennial borders? It provides another enjoyable dimension in gardening, especially toward dusk or on a dewy evening. Here are some plants with scented flowers or foliage. "L" denotes scented leaves.

*Achillea*, silver-leaved kinds, L
*Allium*, most
*Anthericum liliago*
*Artemisia*, esp. *A. absinthium*, L
*Calamintha nepetoides*, L
*Centranthus ruber*
*Chrysanthemum*, L
*Clematis heracleifolia* & cvs.
*Convallaria majalis* & cvs.
*Dianthus*, most
*Dictamnus albus*
*Eremurus* sp. & cvs.
*Filipendula hexapetala*
*Galtonia candicans*
*Geranium*, esp. *G. macrorrhizum*, L
*Hemerocallis flava*
*Hemerocallis* 'Hyperion'
*Hesperis matronalis*
*Hosta plantaginea* & its hybrids
*Hyacinthus* cvs.
*Hyssopus officinalis*
*Incarvillea delavayi*
*Iris*, bearded, some
*Iris unguicularis*, (for South)
*Lavandula* sp.
*Lilium auratum, L. candidum, L. longiflorum, L. regale, L. speciosum* & certain hybrids
*Lupinus*, Russell hybrids
*Malva moschata*
*Melissa officinalis*, L
*Monarda* sp. & cvs., L
*Myrrhis odorata*, L
*Narcissus*, esp. *N. poeticus*
*Nepeta* x *faassenii* (*mussinii* of gardens), L
*Origanum vulgare*, L
*Paeonia lactiflora* hybrids, certain ones
*Phlox paniculata* cvs.
*Polygonatum odoratum*
*Primula vulgaris*
*Ruta graveolens*, L
*Santolina chamaecyparissus*, L
*Thymus* sp. & cvs., L

### ARCHITECTURAL PLANTS

Many are tall and stately, able to stand as accents if planted singly (not necessarily in the perennial border). Foliage is often bold, having sculptural qualities, so judicious placement for best visual effect is essential. The larger herbaceous sorts can intensify seasonal changes in the landscape and have a special role in milder parts of the country where summer blends into winter. Plants marked with an asterisk are essentially for warm climates. SSB denotes a biennial which self-sows and can be treated as a perennial.

*Acanthus mollis* 'Latifolius'*
*Acanthus spinosus**
*Achillea filipendulina* 'Gold Plate'
*Agave americana**
*Althaea rosea*, SSB
*Angelica archangelica*
*Aralia cachemirica*
*Aralia racemosa*
*Aruncus dioicus*
*Bergenia* sp.
*Cardiocrinum giganteum**
*Cephalaria gigantea* (*tatarica*)
*Crambe cordifolia*
*Cynara cardunculus**
*Cynara scolymus**
*Echinops* 'Taplow Blue'
*Eremurus* selections
*Eryngium* sp.
*Euphorbia characias*
*Ferula* sp.
*Foeniculum vulgare*, also var. *purpureum*
*Gunnera manicata**
*Hedychium gardneranum**
*Helleborus corsicus*, *H. foetidus* & *H. lividus*
*Heracleum mantegazzianum*, SSB
*Hosta sieboldiana*
*Inula helenium*
*Iris*, tall-leaved sorts
*Kniphofia* cvs.
*Ligularia* sp. & cvs.
*Macleaya* (*Bocconia*) *cordata*
*Onopordum acanthium*, SSB
*Peltiphyllum peltatum*
*Phlomis russeliana**
*Polygonum cuspidatum* 'Crimson Beauty'
*Rheum palmatum* 'Atrosanguineum'
*Rodgersia*, many
*Salvia argentea*
*Salvia sclarea turkestanica*, SSB
*Trachystemon orientale*
*Veratrum* sp.
*Verbascum bombyciferum*, SSB
*Zantedeschia aethiopica* & cvs.*

### EVERGREEN OR NEARLY SO

Of interest mainly in moderate or mild climates. Harsh winters and heavy snow lessen their evergreen quality. Ones marked with an asterisk (*) are dependably hardy only in the South. For California, see pp. 68-73.

*Acanthus* sp.*
*Agave* sp.*
*Ajuga* sp. & cvs.
*Armeria maritima*
*Armeria plantaginea* (*latifolia*)
*Aspidistra lurida**
*Bergenia* sp. & cvs.
*Cortaderia* sp.*
*Dianthus*, most
*Epimedium*, some
*Eryngium bourgatii*, basal leaves
*Euphorbia characias**
*Euphorbia robbiae**
*Fascicularia* sp.*
*Galax urceolata* (*aphylla*)
*Helleborus*, many
*Heuchera sanguinea* cvs.
*Iberis sempervirens*
*Iris foetidissima*
*Iris pallida dalmatica*
*Iris unguicularis**
*Kniphofia* cvs.
*Lavandula angustifolia*
*Libertia* sp.*
*Liriope muscari* cvs.
*Liriope spicata*
*Melianthus major**
*Phlomis russeliana**
*Phormium* sp. & cvs.*
*Saxifraga geum* 'Dentata'
*Saxifraga umbrosa*
*Senecio cineraria*
*Shortia galacifolia*
*Sisyrinchium striatum**
*Stachys byzantina* & cvs.
*Symphytum grandiflorum* (semi-)
*Teucrium chamaedrys*
*Yucca* sp.

### GRAY-LEAVED PERENNIALS

Perennials with gray leaves are useful to tone down strong nearby colors. They are especially pleasing when combined with bronze or purple foliage plants or with ones having white flowers. From a distance they often present a flowering effect all summer. Virtually all gray-leaved plants, save variants of *Hosta*, require full or near full sun for best color, and most benefit from rather dry soil, *Anaphalis*, *Hosta* and *Thalictrum* being exceptions. Here are some to try.

*Achillea*, esp. *A.* 'Moonshine', *A.* x *taygetea*
*Anaphalis* sp.
*Artemisia*, esp. *A. ludoviciana* & *A. l.* 'Silver Queen', *A. schmidtiana* 'Nana'
*Cerastium* sp. (invasive)
*Crambe maritima*
*Dianthus* sp. & cv.
*Eryngium maritimum*
*Festuca ovina glauca*
*Helictotrichon sempervirens*
*Hosta sieboldiana* & cvs.
*Iris ochroleuca*
*Lavandula angustifolia*
*Lychnis coronaria*
*Marrubium incanum* (*candidissimum*)
*Potentilla*, some
*Ruta graveolens* & cvs.
*Salvia argentea*
*Salvia officinalis*
*Scabiosa graminifolia*
*Sedum*, some
*Stachys byzantina* (*olympica*)
*Thalictrum speciosissimum*
*Verbascum bombyciferum* (biennial)
*Veronica incana*
*Veronica* 'Minuet'

### EDGING PLANTS

The following are useful in many ways in addition to their use in the perennial border.

*Ajuga genevensis*
*Alchemilla mollis* (*vulgaris*)
*Allium senescens glaucum*
*Artemisia pontica*
*Artemisia schmidtiana* 'Nana'
*Aster* (dwarf Michaelmas daisies)
*Astilbe chinensis pumila*
*Bergenia* sp.
*Campanula carpatica*
*Ceratostigma plumbaginoides*
*Chrysanthemum* 'White Bomb'
*Chrysogonum virginianum*
*Coreopsis auriculata* 'Nana'
*Coreopsis* 'Goldfink'
*Dianthus* cvs., esp. *D.* x *allwoodii*
*Dicentra*, except. *D. spectabilis*
*Epimedium* sp.
*Festuca ovina glauca*
*Geranium* sp.
*Geum borisii* of gardens
*Hemerocallis* (dwarfs)
*Heuchera sanguinea* cvs.
*Hosta* (small-leaved kinds)
*Hyssopus officinalis*
*Iberis sempervirens*
*Iris pumila*
*Lavandula angustifolia* (esp. dwarfs)
*Liriope muscari* cvs.
*Liriope spicata*
*Mentha suaveolens 'Variegata'*
*Nepeta* x *faassenii*
*Ophiopogon* sp.
*Origanum vulgare* & *O.* 'Aureum'
*Polygonum affine*
*Pulmonaria* sp. & cvs.
*Ruta graveolens* cvs.
*Salvia officinalis* cvs.
*Santolina* (esp. dwarfs)
*Stachys byzantina* (*olympica*) & cvs.
*Teucrium chamaedrys*
*Thalictrum minus*
*Thymus* x *citriodorus* cvs.
*T. vulgaris*
*Veronica incana*

*Roche*

*Aquilegia* 'Rose Queen'

### FOR MEADOWS

Meadow gardening is gradually coming into its own, especially in parts of the country where brush does not quickly invade fields. It has not gained many followers in suburbia, where trim and tidy lawns reign, but a number of people elsewhere like the "natural" appearance it creates. Some maintenance is indeed required, namely mowing once a year in autumn and culling tree and shrub seedlings, as well as curbing certain aggressive weeds by hand or spot treatment with herbicides. Perennials must be rough-and-tumble sorts to cope with the competition, and they appreciate its absence the first year or two until established. Here are a few to try:

*Achillea* sp.
*Allium senescens*
*Allium tuberosum*
*Amsonia tabernaemontana*
*Angelica archangelica*
*Artemisia ludoviciana albula*
*Artemisia ponticum*
*Asclepias tuberosa*
*Aster* sp.
*Baptisia australis*
*Campanula persicifolia*
*Cassia marilandica*
*Centaurea macrocephala*
*Chelone* sp.
*Chrysanthemum leucanthemum*
*Coreopsis* sp.
*Echinacea* (*Rudbeckia*) *purpurea* & cvs.
*Echinops* 'Taplow Blue'
*Eupatorium* sp.
*Euphorbia cyparissias*
*Filipendula* sp.
*Geranium sanguineum*
*Helianthus tuberosus*
*Helenium autumnale*
*Heliopsis* sp. & cvs.
*Hemerocallis*, inexpensive old cvs.
*Inula helenium*
*Iris pseudacorus*
*Iris sibirica*
*Lathyrus latifolius* (vine)
*Liatris* sp.
*Lupinus*, Russell Hybrids
*Lychnis* sp.
*Lysimachia* sp.
*Lythrum salicaria* cvs.
*Macleaya* (*Bocconia*) *cordata*
*Malva moschata*
*Monarda fistulosa*
*Monarda didyma*
*Nepeta cataria*
*Oenothera tetragona*
*Physostegia virginiana*
*Ratibida columnifera*
*Rudbeckia* sp. & cvs.
*Sedum spectabile*
*Solidago* sp.
*Tanacetum vulgare*
*Thermopsis caroliniana*

### RABBIT-RESISTERS

Rabbits have their place in the field or on the table, not in the garden. It is disheartening in a rural area to grow perennials to flower-bud stage, then find the stems neatly severed at the base. They do not seem to have much of an appetite for the following:

*Achillea* sp.
*Aconitum* sp.
*Anaphalis margaritacea*
*Artemisia* sp.
*Aster* sp.
*Astilbe* sp.
*Baptisia australis*
*Bergenia* sp.
*Campanula persicifolia*
*Cimicifuga* sp.
*Colchicum autumnale*
*Digitalis* sp.
*Doronicum* 'Miss Mason'
*Epimedium* sp.
*Filipendula hexapetala*
*Geranium* sp.
*Hemerocallis* cvs.
*Hosta* sp. & cvs.
*Iris* sp. & cvs.
*Kniphofia* sp. & cvs.
*Myrrhis odorata*
*Narcissus* sp.
*Papaver orientale*
*Salvia argentea*
*Sedum spectabile*
*Stachys byzantina* (*olympica*)
*Tanacetum vulgare crispum*
*Trollius* sp.
*Yucca* sp.

# GARDENS TO VISIT

For travel directions, hours open and admission fees, as well as additional specialized plant collections, consult Brooklyn Botanic Garden Handbook #64, *American Gardens—A Traveler's Guide*. See back cover of this Handbook for ordering information.

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Vol. 34 No. 4
(Winter 1978-79)

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BROOKLYN BOTANIC GARDEN RECORD
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*John A. Lynch*

This surprising summer bloom isn't a rose or a peony; it's one of the hardy cacti, *Opuntia humifusa*. A close look will confirm the presence of pads and spines.

# Letter from the Brooklyn Botanic Garden

As Botanic Garden members know, the winter issue each year is devoted largely to a selection of articles of more than passing interest that have appeared in other publications in the previous twelve months. Let us take this opportunity to thank the respective periodicals and contributors for their kind permission to bring these articles to the attention of P&G readers.

Because the other three issues each year are on special subjects in Handbook format, the winter issue also provides an opportunity to include a range of topics that have not been touched upon recently or at length, *e.g.*, endangered species, solar heating, ikebana. Concerning the last, even if you have little inclination to arrange flowers in the home, the article beginning on page 40 may be of real interest because it points up the subtle cultural differences that occur when eastern and western ways of thought come face to face.

Energy considerations were much in the horticultural news in the last year, especially the small, passive-type, solar-heated home greenhouses which are showing their practicality for certain purposes even in the coldest parts of the United States. (See article on page 17.) A highly successful example is at the Berkshire Garden Center in Stockbridge, Massachusetts, where a variety of leafy vegetables can be harvested all winter though the temperature occasionally dips to -20°F outdoors and to the lower 30s in the solar unit. The supplementary heating cost for this greenhouse was less than $30 in the unusually snowy winter of 1977-78.

Gardeners as a rule are wildlife enthusiasts, but the feelings of many are somewhat tempered by the knowledge that some kinds, even the field mouse, have been wreaking more than the usual amount of havoc with trees and shrubs. For a report on them, see Margaret Crooks' article on page 24.

An ecologist friend of ours with a special interest in vegetation types grumbles that the deer in his area are at their most numerous point since the Ice Age, and that no one has told his browsers that mountain-laurel foliage is supposed to be toxic. There has been no shortage of deer remedies proposed recently. One which is of disputed effectiveness calls for the mixing of Louisiana hot sauce with a spreader and diluting with water, to spray on favored plants. The Cary Arboretum is testing tufts of human hair placed in trees as a possible repellant—a recycling measure that should be of interest to barbers now that people are getting haircuts again. A fellow editor we know, with no dog and a large rock garden, has found that if she makes a barking noise it scares off the deer for awhile. Bird netting over favored shrubs is still another suggestion that has been put forth.

Good gardening in 1979.

Sincerely,

Frederick McGourty, Jr.

Editor

All photos: Clarence E. Lewis

Scots pine (*Pinus sylvestris*)

*Different ways of looking at . . .*

# THE WONDERFUL WORLD OF TREES

Clarence E. Lewis

Reprinted from AMERICAN NURSERYMAN, September 1, 1978

Trees have various attractive characteristics other than their flowers, although we all enjoy and look forward to the blooms each year. Some trees bear flowers in strange places, like the eastern redbud (*Cercis canadensis*). Their flowers are located tight to the small and large stems, unlike the flowers of other trees.

The white eastern redbud produces flowers in the same way, and these are particularly attractive because of the sharp contrast between the pure white flowers and the black stems from which they emanate. There is also a double-flowering selection, listed as *Cercis canadensis* 'Flame'.

And so, we can follow the flowering display by observing the large, erect, bright red flowers of ruby red horse chestnut and the great number of flowering crab apples. In June, the Japanese or kousa dogwood expands its bracts in great profusion, and the Japanese stewartia blooms with its large, single camellia-like flowers. July finds us admiring the great misty-yellow flower clusters of the goldenrain-tree (*Koelreuteria paniculata*), and then August presents its show of pale yellow flower clusters on the Japanese pagoda-tree (*Sophora japonica*). Finally, from late August until the first severe frost, *Franklinia*, with its fascinating history, puts on a display of white flowers with yellow centers. They are still present as the autumn foliage provides contrast with its colors of bronze, red, green and gold.

**Fruits**

Fruits, too, often go unnoticed, particularly the bright purple-red cones of Norway spruce which first appear erect and eventually turn tan and droop in contrast with the always-erect and colored cones of the firs, particularly the Korean fir, which produces cones at an early age. The true cedars (Atlas, blue Atlas, Lebanon and deodar) also have erect fruit which, if picked green, may never open.

Many fruits do not receive much attention. This is true of the Amur maple whose winged seeds are a bright red from late July into August. Longer lasting are the bright red winged fruits of the Tatarian maple which are highly colored in late June and remain so until early August.

Fall foliage colors are important to our changing landscape, but there are other colorful and interesting autumn observations to be made. Notice the hanging, bright red leaves of the flowering dogwood, then walk around and observe the undersides of the same leaves. Find a rich red sweetgum leaf or two, and then hold it up to the sun so you can inspect every little detail—the strong colorations and, especially, the veins forming geometric sections.

You may see a sourwood tree with gorgeous red, shiny foliage, and then find another sourwood that is not red, but a deep, shiny purple. You travel on to find the clear orange-red of black gum or sour gum; a red maple as brilliant as any cultivar; a paper birch, contrasting its clear yellow foliage with the ever-present white-barked stems, and even a striped maple, with large yellow leaves.

There is much more to be found among the trees—one sweetgum has an abundance of corked and winged growth on the young and older branches; another has smooth twigs. One river birch has orange-to-yellow bark, while an older one over the next hill has a coarse bark that in

The graceful, long-lasting keys of the Tatarian maple (*Acer tataricum*) turn a brilliant red as they mature in mid-summer.

Curling, multicolored bark is characteristic of the paperbark maple (*Acer griseum*) at left. Below is an excellent example of the deep V-form of the main trunks of Japanese zelkova (*Zelkova serrata*), a stately relative of the American elm.

June is the month for Japanese dogwood (*Cornus kousa*) to burst into tiers of bloom. The white, tear-shaped bracts are followed by raspberry shaped and colored fruit in late summer.

no way resembles that of the first one observed. The paperbark maple shows bark curling from its branches, so sunlight shining through them creates different images. One of the cherries, *Prunus serrula,* becomes just as colorful as it glistens in the afternoon sun.

### Young Trees

Young trees are also interesting. Get up early some spring morning and observe a small flowering dogwood or young sassafras before the new leaves have expanded. It is a time to observe the branching structure and the way the young branches stretch outward, like arms, and gently curve upward at the tips. Trees with sympodial branching are the most interesting. These have no distinct terminal branching, and side branches continually take the lead to show a more-or-less horizontal branching habit.

Next, find an old tree with rugged bark and burl growth on the main trunk. A good example is the black locust which has deeply grooved bark and bunches of burl growth to accentuate its maturity. The clean ridged bark of an old tulip-tree stretches ever upward, and seems to disappear into the foliage and branches many feet above. There are a number of trees that have interesting bark—the beech with clean smooth bark; the chestnut oak with its rugged bark, which truly typifies great strength; the sweet birch with plated bark; or the honey locust with its sectioned bark and vicious spines. Any mature tree will reveal something you may never have noticed.

Now, watch the spring buds begin to expand on a small tree whose activities can be observed daily. When the weather turns warm, the tree can be checked more than once a day.

Let's follow a small tree, such as the paperbark maple (*Acer griseum*), and watch the leaves emerge as bronze leaflets covered with hair. This covering reduces the amount of water loss, so the leaflets can continue to grow, produce early flowers, and, finally, mature as green leaves with glaucous undersides. The season continues. Nothing spectacular may happen in the summer, but as fall arrives the greens are suffused with reds, which finally take over.

Aside from color, foliage has other in-

Muscular limbs and trunks of the American hornbeam (*Carpinus carolinana*) are a good foil for the abundant beech-like foliage.

teresting characteristics. The texture of the goldenrain-tree (*Koelreuteria paniculata*) is delicate as it begins its yearly activities, and finally expands into an overhead panorama. The best view of this tree is from beneath its branches. Other trees that should be studied in the same manner include the honey locust; the Kentucky coffee-tree; the golden-larch (*Pseudolarix*), whose grasslike leaves appear at the ends of long spurs; and the ginkgo.

I suggest that multiple-stemmed trees be used more often. Those whose bark is attractive are most commonly used, like the white-barked birches, the muscular-stemmed American hornbeam, the shadbush or shadblow and the Japanese dogwood. But others, such as the eastern redbud, flowering dogwood, Amur maple,

Tatarian maple and the large, shrubby Amur honeysuckle should be used.

On the other hand, single stems are not objectionable and can become the focal points on a large lawn area. Austrian pine has older stems that show a strong contrast of black and near white. This contrast becomes particularly noticeable after a rain. These single-stemmed trees are more attractive when repeated over a large area and unevenly spaced.

### Tree Forms

Tree forms are the backbone of a well-planted and pleasing landscape. Have you ever looked at a picturesque old eastern white pine, a Scots pine, a cedar of Lebanon or a wind-worn Monterey cypress? The impression caused by the irregular layers of branches is favorable and lasting.

The weeping trees, such as the weeping European beech, the weeping purple-leaved European beech, the beautiful green fountain of Sargent hemlock, the weeping eastern white pine and the old Camperdown elm are patriarchs of the plant world, and rank high as admirable plants.

On the other hand, those trees that have fastigiate branching habits and are more or less columnar in outline have a place, too. They include the columnar European beech and the columnar English oak. For a softer texture, try the same form of the eastern white pine, which is usually not quite so narrow.

Forms are varied, and the pyramidal form has many representatives—the Norway spruce, the Oriental spruce, the concolor fir, Nordmann's fir and the pin oak are just a few. The pyramidal form becomes almost spirelike in the Serbian spruce (*Picea omorika*), which becomes more and more spirelike as it matures.

The squatty but dense dwarf eastern white pine need not be just a blob in the landscape. It can be substituted for large boxwoods, and its soft texture creates a restful atmosphere.

# BIRD NETTING IS FOR MORE THAN THE BIRDS

Cleaning up leaves in autumn is seldom fun. Sometimes it is just plain exasperating, especially if there are nearby oak trees, which shed their thickish foliage later than other kinds and take their time in doing it. If there are pachysandra, low-growing junipers, prostrate cotoneasters and other twiggy shrubs around, the added chore of hand-picking fallen tree leaves from them is time-consuming. But not for Mr. and Mrs. William M. Flook, Jr., of Greenville, Delaware. Their answer is to spread a very inconspicuous green-black bird netting, made of plastic, over favored plants in early autumn. They remove most of the netting—and the trapped leaves—before winter sets in.

The netting used by the Flooks is called Vexar, made by DuPont and available from large garden-supply outlets. It comes in a roll 6′ × 50′; a 12′ × 50′ roll is also available. Mesh: 5⁄8″ × 7⁄8″. The price for the smaller roll is about the same as for a dinner at a moderately inexpensive restaurant. With proper care, the netting lasts at least five years. It can be cut to any size.

In some parts of the Flook's garden the netting is kept on all winter, with a periodic lifting to remove the tree leaves. Presto, an attractive low carpet of all-green pachysandra in January, a time when most gardens in the mid-Atlantic states have a littered appearance. Mrs. Flook, a keen and energetic rock gardener, has found many uses for this netting, entirely covering her diminutive shrubs and some beds with it.

# CALLING THE ROLL OF THE WORLD'S VANISHING PLANTS

## New international *Red Data Book* reveals how grazing, logging, development, pollution and other pressures could doom many species

Edward S. Ayensu

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While the plight of endangered creatures such as blue whales and whooping cranes is widely appreciated, it is less well known that from 20,000 to 25,000 of the world's *plant* species face extinction. Today botanists are trying to locate, identify and protect these species; it is an enormous task, complicated by considerations involving law, land use, economics and large doses of human emotion. In many parts of the world the flora is so little known that the exact status of a given plant is difficult to determine.

The International Union for the Conservation of Nature and Natural Resources (IUCN) has appealed to botanists around the world to supply accurate information about endangered species in their countries. The IUCN's Threatened Plants Committee, of which I am the chairman for North America, has assembled these data for a new publication to "highlight the growing and continuing threats to the world's natural ecosystems and the diversity of species they contain." This *Plant Red Data Book* is being prepared in London and should be available by the end of the year. Although it will cover only 250 of the thousands of species the IUCN feels need protection, these species include some of the plants that are in the gravest danger, or are particularly spectacular, useful or interesting.

The plants listed in the book have become endangered for a wide variety of reasons—overgrazing by domestic or feral animals, herbicide spraying, fires, cutting for timber or firewood, damage by off-road vehicles, forest clearing and collecting by plant fanciers. (Ironically, no plant has become threatened because we eat it—societies maintain their important food plants through careful stewardship.)

### The Case of Furbish's Lousewort

Today the most celebrated of all endangered plants is an unprepossessing member of the snapdragon family, Furbish's lousewort (*Pedicularis furbishiae*), which was named for Kate Furbish, an American turn-of-the-century botanical artist of considerable repute. After a careful search, the U.S. Army Corps of Engineers has located only about 1,000 individual plants—all of them along a 120-mile stretch of the St. John River in northern Maine and a much shorter stretch of the river in New Brunswick. The surviving louseworts occur in the area of the proposed Dickey-Lincoln hydroelectric project, which, if constructed, would inundate them. Because of the special protection endangered plants and animals have been given in the United States, the future of the Dickey-Lincoln project has been called into question.

Other American plants are endangered by much smaller development projects. One such is the Dehesa beargrass or San Diego nolina (*Nolina interrata*), a lovely relative of the lily that bears a flower stalk about five feet high. Only about 150 individual plants are known to exist, and they are all distributed along the margins of two or three small gullies slated for development in San Diego.

### Problem Worldwide

It is not only in the United States that plants are under pressure. The temperate Cape flora of South Africa, dominated by

T H Everett

Traditionally considered sacred, the baobab (*Adansonia digitata*) has become imperilled because of the firewood shortage in its range. The "tree God planted upside down" is a poor firewood subject because of its pulpy wood, and must be stripped rather than chopped.

heaths and proteas—flowers that look like roses made of porcelain—is one of the most varied and spectacular in the world. Yet it has been estimated that approximately 1,500 species in the Cape flora are threatened. One of the rarest proteas, *Mimetes hottentotica,* is being invaded and ousted by weedy Australian trees such as hakeas and rooikrans.

Even more disquieting is the illegal trade in South African cycads. These plants are so coveted by collectors that recently a specimen of *Encephalartos woodii* was stolen from the Durban Botanic Gardens and is said to have sold for $65,000. Another endangered cycad, *Encephalartos barteri,* is being destroyed because it has a seed from which a hallucinogenic drug can be extracted—thieves even stole seeds from a specimen in Great Britain's Royal Botanic Gardens at Kew.

The African-violet (*Saintpaulia ionantha*), widely known as a house plant, is exceedingly rare in its native habitat, the damp cliffsides of eastern Tanzania. There its precarious existence is threatened by the removal of forest trees that normally provide the shade in which it grows best.

Indeed, throughout the tropical regions of the world the forests are being cut down at an alarming rate. Exploitation on this scale could, in the opinion of many ecologists, ultimately affect global climate.

Rain forests contain many particularly vulnerable, rare and famous species that are disappearing before the ax. A number of the striking displays of rhododendrons that used to grace the Himalayan foothills have been so depleted that there are now much grander displays in the Royal Botanic Garden at Edinburgh, Scotland. In the Himalayan orchid jungles, many endemic, epiphytic orchids used to be safely supported by specialized microclimatic conditions. The effects of primary forests being clear-cut for timber, along with pressures of urban and agricultural expansion, as well as collecting by commercial plant hunters, are dooming extensive, beautiful populations.

### Conserving the Gene Pool

Japan, the world's largest importer of wood products and pulp, is expanding its industrial timber operations into the forests of Brazil, Borneo, Malaysia, Sarawak, Indonesia and New Guinea. The chronic and desperate desire for wood and wood by-products is now threatening the Sumatran home of the world's largest flower, *Rafflesia arnoldi*. This rare parasitic plant, which grows on the forest floor attached to roots of tropical grapevines, has a flower that can be three feet wide. Its habitats are dangerously near the Japanese timber concessions, and it suffers another threat from the trampling feet of curiosity seekers.

The islands of Malaysia and Indonesia are the home of many species closely related to tropical fruit trees such as the durian, breadfruit, citrus, mango and banana. It is important to save these plants in order to investigate them for the characteristics of fruit quality and disease resistance that their genes may carry.

It is impossible to calculate the potential value of the genetic material carried by plants. Let us consider the origin of wheat, the world's most widely and intensively cultivated crop (an estimated 381 million metric tons this year). The genetics of one of the common wheats known as Wild Emmer indicates that it comes from a cross between a wheat called Wild Einkorn and a wild grass, possibly *Aegilops speltoides*. This hybrid is cultivated in such places as Ethiopia, Yugoslavia and southern India. Had *Aegilops*, the wild grass, been wiped out, the loss to mankind would have been incalculable.

It is obvious that for agriculturalists to breed stronger, disease-resistant varieties, obscure species that could be useful as parental stock must be rescued from possible extinction. To this end a National Seed Storage Laboratory was established in 1958 at Fort Collins, Colorado. It houses more than 100,000 samples of all sorts of seeds, and has a capacity for more than 500,000. There are seed banks in Mexico that store wheat and corn, a bean bank in Colombia, a bank for pearl millet and pigeon pea seeds in India, and a rice bank in the Philippines.

### Firewood: An Environmental Crisis

As populations grow in developing countries, pressures increase on forest and savanna lands. Overgrazing by domestic animals, in particular, is causing deserts to encroach upon grasslands. In North Africa, overgrazing results in the creation each year of 247 *thousand* acres of new desert.

Some 1.5 billion people, more than a third of the world's population, depend on wood for cooking and heating. Eighty-six percent of all the wood consumed annually in the developing countries is used for fuel. At least half of this is for cooking.

Pressure on the forests because of demands for firewood is a serious factor in India, central Africa south of the Sahara, Central America, the Andes and the West Indies. Trees are renewable resources and certain fast-growing species can be

John A. Lynch

Lady's slipper orchid is disappearing throughout Europe. In England it survives in only a single locality.

ready for firewood harvesting in five or six years. But most developing countries do not have adequate reforestation programs. In the mountains of Nepal it takes a whole day to gather a supply of firewood, and in some areas of West Africa a villager has to walk fifteen miles to find wood.

The need is so great that wood is poached from officially protected forest preserves. In West Africa people cut each other's hedges at night, and remove scaffolding from building sites. Where wood does not exist at all, as is now the case in parts of India, the Near East and Africa, people burn dung as an alternative—some 400 million tons of it annually. Formerly, much of it was used as fertilizer.

Drought and famine are again this year gripping the Sahel belt of West Africa. With so little vegetation left, even the majestic baobab tree (*Adansonia digitata*) has become vulnerable.

The baobab is virtually the botanical symbol of the hot African countries, and traditionally has been protected by taboo because of its prominence in African religious beliefs. At the mouth of the Senegal River the French botanist Michel Adanson, for whom the genus is named, found trees with European names carved in the bark from the 14th and 15th centuries, and some specimens are reputed to have lived for 5,000 years. The baobab's spongy, swollen trunk can be as much as 100 feet in diameter and serves to store

water; its imposing stature and shape make it recognizable even on a distant horizon. Unfortunately, these great trees are now being stripped and mutilated by people desperate for fuel.

Last year, I encountered an unusual case of preservation of a firewood species during a visit to China—a country that now takes the conservation of flora very seriously. At the Peking Duck Restaurant in the Chinese capital, the wood of *Zizyphus jujuba* is used in the cooking and smoking of the delicious meat in order to bring the duck's bouquet to perfection. Because of its value in preparing this feast, the source of the wood is kept a closely guarded secret, known only to the elite restaurateurs, so that the trees will not be cut down indiscriminately.

### Islands Particularly Vulnerable

The flora of the heavily populated Japanese islands has suffered great damage in the past. Indeed, island ecosystems in general are particularly vulnerable to destruction. The Hawaiian Islands are a good example. The progenitors of the present-day Hawaiian flora arrived at infrequent intervals over thousands of years, and in the isolation of the islands speciated into new plant forms, of which 97 percent exist nowhere else in the world. In these islands plants assumed special characteristics. Some developed shallow roots to spread horizontally throughout the thin soil. Others developed without defensive thorns or spines—so common among plants in similar mainland habitats—since mammalian foragers and tramplers were absent. Weird-looking plants emerged with leaves confined to dense rosettes at the tips of spindly branches; some families, such as the violet, which are small herbaceous plants elsewhere, evolved into tree-sized giants.

Then the native Polynesian Hawaiians and the European colonists arrived. Human occupation has resulted in logging, massive erosion, introduction of troublesome exotic weeds and fast-growing exotic trees such as the *Eucalyptus*, overgrazing by feral goats and swine, and massive land clearing. Overall, more than 50 percent of the native flora is endangered, threatened or already extinct.

Many plants are used for their therapeutic values and this has a twofold effect on the world's flora. On the one hand, the demand for herbs, particularly in parts of Africa and Asia, has brought some plants near extinction. On the other hand, the growing evidence that herbal medicine is not without scientific foundation has made it imperative that no plant species should be wantonly destroyed without analysis of its chemical constituents.

Recent studies of Latin American orchids, for example, may offer new insights into the aging process. Bees that visit the orchids collect chemicals from them, which they store and possibly metabolize. It is now known that the male bees that collect these fragrant compounds live longer than males that do not. Do the compounds, then, control aging in some way? If the orchids disappear, we may never know the answer.

Conservation of the world's flora requires a commitment to preservation of natural landscapes and perpetuation of natural vegetation. This commitment is being made by a number of governments, and also by ordinary people who are simply trying to combat the degradation of their homelands. Last year in India, in order to resist the felling of a forest, the people of the Alaknanda River Basin in Uttar Pradesh peacefully demonstrated against the cutting by joining hands around the trees to ward off the loggers. The forest was subsequently saved.

The celebrated British tropical botanist, E. J. H. Corner, related a comparable incident in Australia: "A few years ago, not a national park but a car park was planned in Sydney. It would have necessitated the felling of some stately trees of the Moreton Bay fig (*Ficus macrophylla*). It was not the officials, however, that saved them, or an august body of scientific representation, but the labourers of the Builders' Federation who threatened to strike if the trees were cut."

Saving the world's plant resources calls for more protection and management, more research, and an increasing level of public awareness about our vanishing heritage. The *Plant Red Data Book*, it is hoped, will help to generate that awareness.

*One of the world's great plant collections . . .*

# ENGLAND'S HILLIER ARBORETUM— NOW OPEN TO THE PUBLIC

Fred Whitsey

Reprinted from THE DAILY TELEGRAPH (London), May 6, 1978

When Queen Elizabeth the Queen Mother officially opens the Hillier Arboretum at Ampfield in Hampshire, England, on May 9, [1978,] the occasion will mark the transfer into public hands of a collection of trees and shrubs built up over the past quarter of a century by one man and which is unrivaled in the world. The commemorative oak tree of cypress-like outline which she will plant will symbolize the purpose of the enterprise in its rarity and enduring quality.

More than 14,000 species of trees and shrubs have been planted there during this time, turning the hundred acres of land into a series of garden scenes that range from the jungle-like to sparse mountain uplands. Every possible plant that will grow there has been tried and often every known species of one genus has been assembled, accompanied by its hybrids and varietal forms.

### Geographical Representation

Thus there are more than a hundred different kinds of oak and still more of barberry. Sometimes, however, a genus is represented by a single member, the only one known.

The five continents are represented, and only the polar regions omitted. Even the flora of the equator has a representative—a blueberry that grows in the mountains of Equador.

Most, however, come from the temperate world and are therefore of horticultural significance. Their range is likely to enlarge the number of species that can be grown in gardens, since experimenting has gone on continuously since the arboretum was founded in 1953 by Mr. Harold Hillier, now 73, head of the famous Hampshire firm of nurserymen that bears his family name.

Lately the collection has been extended by the planting of many new plants from Mr. Hillier's expeditions to Russia, Korea, Japan, New Zealand and Tasmania, and through journeys that the arboretum's curator, Mr. Roy Lancaster, has made to Iran, Nepal and Turkey. The past winter, for all its cold, has been welcomed as a means of putting to the test species whose survival in Britain has been uncertain.

### Conservation

A special surprise has been the winter hardiness shown by a croton brought from the wild in Alabama with a collection of plants from the southeastern United States. It is known only there and represents another aspect of the work to be carried out at the arboretum. This is in the conservation of species which are endangered in the wild either by natural means of destruction or by development. Thus the arboretum will become a plant bank and an enduring source of material for propagating. Plants from it could even be returned for re-establishment in their natural habitat.

The conservation aspect applies also to plants in cultivation, many of which are endangered by standardization and the ebb and flow of public taste.

Though primarily a collection, the disposition of the plants has resulted in a richly varied and immensely pleasing landscape bordered by the New Forest. To the plantations of trees and shrubs, big plantings of herbaceous plants and roses

have been woven into the scheme. So have plantings of alpines, and there is a peat garden and a water garden, while the plantation of bamboos is one of the richest ever assembled.

Last year the arboretum was transferred to the ownership of Hampshire County Council, a charitable trust having been established. At present the public is being admitted to the Hillier Arboretum between 9:00 a.m. and 4:30 p.m. Monday to Fridays, except Bank Holidays, but it is hoped that it will be possible to extend these times to weekends later.

*Michael Warren*

Harold Hillier, founder of Hillier Arboretum.

*Greenhouse grower John H. Pierce says . . .*

# LET'S KEEP SOLAR SIMPLE

Reprinted from NEWS & VIEWS (American Horticulture Society), July, 1978.

Solar energy for the home greenhouse can be very effective without being complicated and expensive, according to John H. Pierce, author of *Greenhouse Grow How,* published by Plants Alive Books (Seattle, Washington).

"Most of the current research and experimentation is with the active solar systems which involve outside sources of energy for pumps or blowers and sophisticated engineering for collection of storage," Pierce says. Passive systems, which need no outside source of energy, are being overlooked.

Since the early 1930s, people have been growing cool crops all winter in structures such as the sun pit greenhouse with the sun as the only source of heat energy. The principles involved can be applied to all types of home greenhouses.

Get the heat in! Hold the heat overnight with the proper insulation. Any container filled with water, painted black, and exposed to the sun will absorb heat.

"This last winter I supported the south bench in my six-by-eight foot glass greenhouse with four 55-gallon oil drums, full of water and painted black on the sun side.

"The water, heated to a maximum of 130°F, and night insulation kept the house above freezing. Adding black plastic bags full of water along the north wall increased the heat absorption to give an average winter temperature of 44°F. This let me grow a delectable crop of lettuce, spinach, radishes, parsley and other herbs for salad greens all winter.

"It is a simple and inexpensive system for passive absorption of solar heat!

"Even better than the 55-gallon drums are square or plastic containers painted black and stacked on their sides. A rule of thumb is that you need two gallons of water storage for every one square foot of glass or polyethylene, in order to get winter temperatures sufficient to grow salad greens in Canada.

"If you are building a new greenhouse, by all means attach it to the residence on the south side as a lean-to. Stack your black water containers against the solid wall of the house. The lean-to then acts as a solar collector and will provide extra heat for the residence.

"Keep the wind off! Use windbreaks of plant material or fencing to divert wind away from the greenhouse. Don't forget the wind-chill factor! When the wind blows at ten miles per hour and the thermometer reads zero, the temperature is actually 22 degrees below zero.

"Keep the heat in at night. Last winter I used air-cap or bubble pack polyethylene applied to the glass on the inside. On the outside I used panels of Coraplex, a double-wall, plastic panel which admits 80 percent of the light.

"Over the Coraplex I installed a roll-down thermal blanket of aluminum mylar as a heat barrier. Grant you, there is the inconvenience of covering and uncovering the greenhouse every night, but the fresh salad greens in January are worth it.

"There are a host of materials which will hold the heat in at night, and I have found that a double covering helps to retain more heat.

"Don't let the cloudy winter day fool you into thinking there is no solar radiation. Often, the overcast sky diffuses light so that rather than the 10,000-foot candles of sunshine, there may be as much as 14,000-foot candles of solar radiation.

"Keep your heating simple with a passive solar system and enjoy the tranquil feeling of self-reliance and the taste of fresh greens in the winter that you get growing your own at home."

E.M. Kittredge

Trout lily (*Erythronium americanum*)

# EMMONS POND— PORTRAIT OF A BOG

Janet Schwengber

Reprinted from THE CONSERVATIONIST, May-June, 1978

In the foothills of the Catskills in Otsego County in New York there exists a lonely somewhat eerie place called Emmons Pond. Called by local people the "pond," it is really a bog. In the northeastern United States many a backwoods wanderer has probably stumbled upon a similar highland bog, confusing it with any ordinary swamp. The mistake is understandable even for an experienced naturalist, for the animals and plants found in one habitat are often found in another. But closer inspection will reveal several significant differences.

For one thing, a swamp develops in a low, shallow area where water accumulates from surrounding drainage. There is usually a dip in the land surrounding a swamp, allowing accumulated water to flow in and out. A bog on the other hand develops when residual water from glacial ice is forced into a sunken rock area and is subsequently covered by soil. There is no outflow; the residual water remains trapped. Accordingly, stagnant bog water receives very little oxygen, even from new waters. Eventually the accumulation of organic material in stagnant bog waters slows down the process of decay, thus giving a bog a fundamentally different chemistry than that of a swamp.

In any natural body of water, nature provides means of resupplying oxygen used up by fishes and plants. But because of its unusual glacial formation, a bog reveals a water environment that is essentially oxygen-starved. What little water reaches a bog from rain or runoff does not have nearly enough oxygen to revitalize bog water. Consequently a nearly sterile water habitat develops.

Nature, however, is intolerant of such sterility. After many years, plants and animals living in a bog engage in continual

adaptations through natural selection to cope with this "mistake" of nature. In time, a tolerable habitat is established to support these newly adjusted forms of life.

### Sphagnum

The terrestrial habitats surrounding an open bog attempt to overcome the watery area. The bog eventually becomes an anchor for an amphibious moss known as sphagnum. This sphagnum moss grows (and floats) over bog waters, creating a mat of intertwined plants which, over a long period of time, may become dense enough to support the weight of a person. At some places, the mat reaches a thickness of seven feet or more, yet it floats over water thirty to forty feet deep. As a result, if one walks on a bog mat, it feels like the ground below is "quaking." And it is. Any disturbance on the surface of the mat causes waves in the water below to reverberate long after the disturbance has ceased.

Sphagnum moss acts as a substitute for soil for plants that grow in it. To survive in this unusual habitat, plants must adapt to an environment that has little oxygen, and where the bacteria responsible for decay cannot survive. Consequently, materials normally recycled in the process of decay—nitrogen, calcium, phosphorous and other nutrients—remain "locked up" in organisms that would, in ordinary circumstances, decay. Not only is the process of decay prohibited by the absence of these three essential nutrients in water, but also by their absence in the acid-type bed rock that frequently surrounds a bog. Thus, a bog provides a very infertile substrait for plants attempting to exist on the mat. If they are to live, these plants must either survive without these nutrients, or devise means with which to capture essential minerals.

Carnivorous plants solve the problem by obtaining nitrogen from captured insects. For example, the beautiful pitcher plant with its trumpet-shaped vase invites insects to crawl down to retrieve food substances lying hidden below droplets of water in the plant itself. Once inside, insects are unable to crawl back out because fine, hairlike projections, pointing downward like tiny barriers of stakes,

Trailing arbutus (*Epigaea repens*) is a frequent resident of the peaty, acid soils surrounding a bog. Its low habit and delicate white flowers make it somewhat hard to spot.

E. M. Kittredge

prevent them from getting out. Once there, insects are captured in a tiny pool of enzymes which slowly digests them, thus providing the pitcher the nutrients it needs.

Meanwhile, as the sphagnum mat grows and extends outward, there is a gradual accumulation of humic acids from the organic compounds that fall into the bog waters. This acid, along with acid from the rock strata, further inhibits the growth of any decay-causing agents. Dead animals and plants decay partially while exposed on the surface, but when they sink, decay no longer takes place. In this way, a bog acts as a mortuary for nature; man can literally discover nature's past still intact, from the bog water's murky depths. By taking core samples from the bottom, a scientist can analyze past climatic conditions of a bog's surrounding area. Knowledge of previous plant associations can be gathered from plant pollen grains that fall on bog waters and settle to the bottom. Also at the bottom are the remains of various plants and animals sufficiently intact to be identifiable. All these elements, then, are an unwritten record of a bog's past.

Water lilies are the only aquatic plants that can tolerate a bog's stagnant, low oxygen conditions. Plankton and most algae are unable to find necessary oxygen, and thus the food chain base is absent for organisms such as fish and other vertebrates. Bog waters appear dark and lifeless. Only hatching insects and stray frogs are present. An eerie stillness remains.

### Leatherleaf and Other Plants

In the seemingly calm lifeless habitat of Emmons Pond, one can witness nature's countless struggles to maintain life. Although protected by pine and spruce trees that surround the back areas of the pond like a fortress, one can nonetheless become aware of the heavy rustling of the leaves of those heath plants able to survive on this mushy bog mat.

*Chamaedaphne calyculata,* known as leatherleaf (so called because of its strong structure that actually prevents evaporation), rubs gently against the stiff stems of cranberry plants able to take hold in the ground of this acid-soaked mat. The buzzing of myriad insects, the occasional screams of jays in the pine woods, or the clucking of redwings all help to cut the chilling quiet.

As the breeze becomes stronger above the trees, the tops of the spruce bend a bit; yet the breeze seems never to penetrate into the bog's murky-looking lifeless waters but just barely ripples the surface. There is no shore for the water to lap against. The water extends under the mat rather than rolling onto it. Thus the ripples created by the breeze do not become larger from the backward shock waves of hitting a shore; rather, they are absorbed quietly and gently by the unseen waters below the mat.

Extending out over the mat are branches of leatherleaf that look as if they are actually trying to escape the sphagnum area. Trailing close on the heels of the leatherleaf, however, is the persistent sphagnum using the roots and "leaning" leaves as supports on which to build up more of the mat. This dense carpet of leatherleaf acts as a bridge for the sphagnum to follow.

A close look at the mat will reveal insects struggling to fly over the damp moss and through the leatherleaf, eventually trying to reach plants that lie hidden and embedded in the sphagnum moss. Some insects land on pitchers and innocently walk down into their tunnels to eventual death, totally unaware that some of their member species, coming from the opposite direction, are struggling hopelessly to get out. The sparkly sundews occasionally gleam with winks of light as they slowly wrap themselves around insects that have triggered sticky hairs to curl themselves more tightly around their victims in a relentless death grasp.

Also growing periodically on the mat in small clumps are skinny little maple trees that appear young but whose dark and aged bark reveal their age—almost ten to twenty years. Other plants grow there, all in competition for whatever oxygenated rain water they can get. The mat of a bog is actually a floating desert. The water below is almost useless to the plants that grow on its surface.

Emmons Pond is a place whose night-

Buhle

The long, narrow leaves of the slender-leaved sundew (*Drosera linearis*) are tipped with sticky hairs in which they trap insects to supplement their nutrient-deficient diet.

falls seem to have the sounds of eventide emanating from its outermost region, but nothing from the center to scream out and tell the outer world of its struggle for survival. There is a mysterious aura here that can compel one to return time and again to observe and experience its haunting beauty. Upon revisiting, one becomes all the more aware of nature's endless efforts to provide a basis for survival.

Surrounding the pond in rich peat soils are a magnificent array of flowers—adder's tongue, bloodroot, meadow rue, various ferns and, finally, the delicate and beautiful trailing-arbutus. Such a cornucopia of beauty can be more appreciated by those who know the years of struggle it took to produce this unusual habitat.

### Conservationists' Role

Emmons Pond is uniquely beautiful and impressively serene. It can serve as a sanctuary from the hustle and bustle of ordinary human existence; it can also alert one to a stark awareness that life is often not, even in solitude, an easy task. The bog's existence and slow, yet persistent success can give to a temporary visitor new strength with which to return to his world and continue confidently his own equally challenging fight for life.

Fortunately, the Nature Conservancy has recognized the uniqueness of Emmons Pond and has saved it from a fate that threatens many such bogs. For surrounding the pond is an area of rich dairy country that has found it necessary to chemically fertilize and lime its fields. These chemicals, especially the lime, that leach into the bog areas have slowly changed the acid conditions of the bogs, causing true pond conditions to slowly take over and prevent nature from allowing bogs to seal.

In 1970, the Nature Conservancy gave to some interested and concerned individuals the necessary money to buy Emmons Pond and the land surrounding it that threatens its existence. This purchase thus prevented the continued use of chemical fertilizers and lime. Today, the bog is a place where students and nature lovers can come to study, or to meditate, or to escape. On another level, the bog serves as a symbol of what rewards can accrue to the quiet and persistent struggler in life at large.

*Imaginative use in design . . .*

# A CORPORATION AND THE NATIVE LANDSCAPE

Samuel B. Harper

The migration of corporate headquarters from a metropolitan area to the suburbs occasionally results in the intrusion of a large office building upon a newly-developing residential area. Such imposition is not always met with full enthusiasm by the new homeowners. How one corporation met this community relations problem is illustrated in the accompanying pictures.

The construction in 1972 of a large addition to the Cuna Mutual Insurance Society home office building in Madison, Wisconsin, disrupted an existing, stereotyped bluegrass lawn that was randomly planted with ornamental trees. Although the original 18-acre plot had years ago been cleared for farm land, there were adjacent wooded acres. In a bold attempt to blend the presence of the enlarging office building with the woods, it was decided to surround the construction with a stylized native landscape. Provision for underground parking of five hundred cars eliminated the parking-lot blight.

Designed by Professor Darrel J. Morrison, chairman of the Landscape Architecture Department of the University of Wisconsin, a development plan was initiated using four types of landscape. A fairly dense planting of Wisconsin trees and shrubs has progressed enough to allow for the introduction of attractive native woodland flowers. A prairie border of mixed grasses and forbs was developed along the woodland edge. In a concession to more conventional landscaping, remaining lawn areas were blended into the native areas through the use of serpentine curves. The concrete roof of one of the two parking ramps was surfaced with 16 inches of artificial soil mix, allowing for the planting of a lawn with a prairie border, all of which obscures the ramp.

A full-time horticulturist, Cathie Bruner, supervises the development of the project. This has enabled the Madison schools to put the area to work as a resource in their outdoor education programs, with Ms. Bruner working with teachers and students on school site plantings. This secondary use of the native planting has added to the acceptability of the presence of a large office building adjacent to a residential area.

All photos: S.B. Harper

Opposite: from this angle, the buildings appear to have been thrust into the earth to emerge as part of the natural meadow. Above: looking down on the serpentine lawns and deep borders employed to integrate the buildings with their surroundings. Below: the outdoor plaza used by both the company and the community and discreetly placed away from the more public sides of the structure.

*Mighty mouse at work . . .*

# SNOWY WINTERS ENCOURAGE RODENT DAMAGE

Margaret C. Crooks

A single Japanese black pine among twelve in a beachfront screen planting died; a natural stand of mountain-laurel went into sudden decline; a whole island of crab apples in an arboretum collection died; roses throughout a garden wilted seemingly at random and died showing no signs of disease.

To find the cause of these fatalities, New Jersey's Monmouth County Shade Tree Commission and Cooperative Extension Service had to do some digging, literally. There was almost no bark damage at soil level on each plant, but the root systems were stripped of bark and fine roots were eaten away. The culprit in all cases was the mighty little mouse—in these instances the pine mouse and the vole.

**Some Plants Affected**

Although mulches and ground covers have been blamed for providing mice with a safe haven from predators and cold, the case cannot be made conclusively. The mountain-laurel (*Kalmia latifolia*) was in a home landscape where a large portion of the property was left in its natural state, shaded by tall oaks and with an understory of dogwood. The soil was a sandy loam well furnished with leaf mold. There was no ground cover used and heavy accumulations of leaves had been raked away. In spite of this, the soft soil was riddled with mouse burrows. Many of the plants were dead on one side only, with roots and bark intact on the living side.

Completely girdled by the persistent gnawing of winter-hungry mice, the tree is a total loss.

Photos: M.C. Crooks

Its roots nearly completely severed, this crab apple has lost its support in the soil and toppled over. Alleged perpetrators: field mice.

The screen of Japanese black pine (*Pinus thunbergiana*) growing in very sandy soil was mulched with woodchips, but before winter the mulch had been pulled back from the trunks of the trees by about two feet. The affected tree was 12 feet tall, full and vigorous. Mice chewed the bark immediately below the surface of the soil and decimated the upper inches of the root system.

The injured crab apples were ten to fifteen years old and comprised a single group in a large collection. The soil was clay loam. The area was mulched with black plastic and had a ground cover of cotoneaster. The roots of the trees were so badly damaged that a stiff breeze blew one to a 45 degree angle. The bark was girdled at the soil surface and immediately below. No damage was noted for more than two inches above the soil surface.

Only certain roses were chosen among the more than one-hundred cultivars in the garden. There was no consistency in color, "blood" lines or class. Soil was a well improved sandy loam. The plants were mulched with four inches of woodchips. Damage was found on plants from one to ten years old. Only the deep anchor roots were left. The tender bark on the canes above the bud union and on the stem below the soil surface was gone.

Members of the large Rose Family, which includes many kinds of plants besides the garden rose, seem to be a preferred mouse food, but the appetite for plant material is by no means limited to the Rosaceae.

**Confinement Brings Trouble**

Gardeners all through the Northeast have noticed a rise in rodent injury to plants. Actually, such extensive mouse damage has been common only in the past two years when there was an unusually deep and persistent snow cover over much of the area. Evidently the mouse population was confined, explaining the limited scope of the damage, and was deprived of its normal winter food.

The only control measure suggested is the use of rodenticides when colonies of mice are discovered. Treating widespread areas is neither feasible nor environmentally sound. To prevent damage, the obvious course of action is to watch plantings closely for signs of mice—holes and seed hulls—and take action at the first indication.

*Another problem for city trees . . .*

# THE THREAT OF THE SODIUM LAMP

David F. Karnosky

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The light that America's cities project into the nighttime sky has been changing color in recent years. As the airborne commuter approaching home after dusk cannot fail to have observed, our cities, as picked out by the lights on the freeways and on the inner-city streets, have been going from blûish-white to glaring yellow.

The new light is there because it is generated by the high-pressure sodium lamp that delivers its foot-candles at one-fifth to one-half of the energy consumption of its predecessors. Yet the same question has crossed many minds: How does the city plant life respond to the new color and increased intensity of this nighttime lighting? What happens when you keep a tree awake all night?

These same questions attracted the attention of Professor Edwin Matzke of Columbia University as long as forty years ago. In the more nearly white and fainter light of the incandescent lamps that chased the shadows of New York City streets in those days, he found that trees extended their growing season. Nighttime lighting caused city trees to hold on to their leaves a month or so after others had dropped theirs. Under controlled conditions in the laboratory, Matzke showed that illumination by incandescent lamps at one foot-candle and even less could extend leaf retention.

The hazard from such unseasonable prolongation of a plant's growth into the autumn is that it exposes the plant to frost injury and winter dieback. Dr. Paul Kramer at Duke University found that extension of the growing season by artificial lighting and the resulting postponement of winter-hardening could cause just such harmful effects in the common hedge and ornamental shrub, glossy abelia (*Abelia grandiflora*).

The explanation of this physiological response takes us into the chemistry, indeed into the photochemistry, of plant life. It is not chlorophyll—the plant pigment that presides at the familiar process of photosynthesis—but another pigment that governs this response. That is phytochrome, the pigment involved in the regulation of the plant's growth process.

During a normal growing-season day, the bulk of the phytochrome pigment gets pushed by the energy of sunlight into its active form in which it absorbs energy from the far-red waves of sunlight, at the edge of the visible spectrum. At night, the pigment drifts back to its inactive mode, in which it absorbs visible light in the red wavelengths.

During the autumn, as the nights lengthen, the pigment tends to remain increasingly in its inactive configuration. Woody plants, especially, then stop their growth and become dormant. Artificial light in the greenhouse or from street lights out-of-doors causes the pigment to stay in its far-red absorbing form, and the plant continues to grow.

Plant species, as will be seen, vary in the sensitivity of their phytochrome systems. What is more, environmental factors, such as temperature, soil moisture and soil fertility, can override the photoperiod effects that cause or prevent the onset of dormancy.

This interesting aspect of plant physiology was neglected for about thirty-five years after Matzke and Kramer had published their findings. Work on the question is now under way again out of concern for the possible untoward effects of the yellow light of the high-pressure sodium lamp.

### The Street-light Revolution

Before 1950, outdoor lighting was gener-

All photos: George Taloumis

Moderately sensitive to the newer high-illumination sodium lamps, the ginkgo can suffer winter damage because its growth period is not normally curtailed in autumn by diminishing daylight length.

ated exclusively by incandescent lamps and gas lights. Mercury-vapor lamps began to come into use at that time because they consumed about one-third of the electrical energy required by incandescent lamps and gave better visibility. Metal halide lamps, somewhat more efficient than the mercury, entered the market later in the 1950s. Then, around 1965, the high-pressure sodium lamp began to take over. These lamps are about twice as economical of electrical energy as the mercury lamp and give an illumination of one to five foot-candles at street level, as compared to the less than one foot-candle output of the incandescent lamps.

By 1975 the high-pressure sodium lamp had captured 3 percent of the outdoor-lighting market. That percentage is now increasing rapidly, as evidenced by the recent installation of 40,000 units in Chicago and by the fact that more than 180,000 are installed in New York City, three-fourths of that city's street lights.

The high-pressure sodium lamp not only puts out more light, but more light in the wavelengths on which the phytochrome system in plants makes its response. When spread out into its component wavelengths by a spectroscope, the intense yellow light from sodium vapor peaks near the yellow line (589 mn) with some radiation in the red wavelengths. Under high pressure in the lamp, however, the spectrum of the light broadens into green on one side of the yellow line and into red on the other.

The phytochrome in plants responds to the red component of the yellow light. So intense is the response that the high-pressure sodium lamps are now recommended for use in growth chambers and greenhouses where commercial nurserymen seek optimum growth rates.

Such is the state of knowledge about the effect of the light from the new high-pressure sodium lamp upon the growth of plants in the greenhouse and laboratory. What is the actual experience with trees on city streets under dusk-to-dawn illumination by this light?

This question is still an open one. The most comprehensive field study to date, published by the Street and Highway Safety Lighting Bureau of the Federal Department of Transportation found no detrimental effects in nineteen cities. Research is continuing, however, and street

Redbud (*Cercis canadensis*) is particularly sensitive, and should be planted where the lights' influence would be minimal.

and park department officials are keeping their trees under surveillance.

Among the first to notice the effect of the high-pressure sodium lamp in an actual street installation were the gardeners at the Brooklyn Botanic Garden in New York City. They were mystified when their poinsettias did not flower in time for the Christmas season of 1972. Then they realized that this "crop failure" was associated with the yellow radiance of the new street lamps that had been installed on Washington Avenue, right next to the Garden's greenhouses.

That city plant life is placed at significant risk by the increased illumination demanded nowadays of street lights is well established by studies conducted at the U.S. Department of Agriculture research center at Beltsville, Maryland, by Henry Cathey and Lowell Campbell. In addition to the vulnerability to frost damage, especially in younger trees, caused by the prolongation of the growing season into the autumn, these authors found reason to believe that the growth-promoting effects of the yellow light may also make trees more susceptible to air pollution.

**Variations in Light-sensitivity**

The ongoing studies of Cathey and Campbell have sorted the trees and shrubs commonly planted in American

Saucer magnolia (*M. soulangiana*) is an excellent choice where sodium lamps are inescapable.

**Relative sensitivity of trees to the extended photoperiod caused by outdoor lighting**

| Insensitive | Moderately sensitive | Extra sensitive |
|---|---|---|
| American hornbeam | Amur cork tree | Birch species |
| Bradford callery pear | Amur maple | Carolina silverbell |
| Canada hemlock | European beech | Catalpa |
| Chinese juniper | Ginkgo | Dogwood species |
| Crab apple species | Holly species | Elm species |
| Japanese boxwood | Honey locust | Fragrant sumac |
| Magnolia species | Ironwood | Goldenrain-tree |
| Oak species | Japanese maple | London plane-tree |
| Pecan | Japanese pagoda-tree | Norway maple |
| Pine species | Linden species | Redbud |
| | Red maple | Zelkova |

cities into three categories of relative sensitivity to the alteration of the natural daily photoperiod by artificial light. Some fifty-two different kinds of plants were exposed to each of the five major kinds of street lights (incandescent, cool-white fluorescent, mercury vapor, metal halide and high-pressure sodium) on a daily cycle of eight hours of sunlight and sixteen hours of artificial light at one foot-candle.

About half of the species, including the oaks, hollies, pines, Canada hemlock, Bradford callery pear and crab apple, showed no apparent response. On the other hand, such important trees as the Norway maple, American elm, flowering dogwood, redbud and London plane tree had to be classified as extra sensitive.

As a rule of thumb, it appears that those plants that show determinate growth patterns are likely to be insensitive to street lights. Shoot growth in these plants results from the opening and expansion of the contents of terminal buds only; such plants usually go through one annual flush of growth in late spring or early summer, which ends with the formation of the new terminal bud for the next year's growth.

In plants with the indeterminate growth habit, by contrast, shoot growth proceeds from successive secondary axes and may continue throughout the summer, without obvious periods of slowdown or rest, until the onset of cooler weather.

The same experiments also ranked the five different kinds of street lights in the order of their effectiveness in modifying the growth of the plants. Based upon stem growth and the prolongation of growth induced in each plant, by illumination at one foot-candle by each kind of lamp, the ranking proved to be incandescent and high-pressure sodium in first and second place respectively in inducing growth, fluorescent and mercury in a third-place tie and the mercury-vapor lamp last. Because the high-pressure sodium lamp delivers more foot-candles of illumination at street level and so to the leaves of nearby plants, as a practical matter it must be ranked first.

The work has thus established some obvious guidelines for the management of urban planting. In places that must be well lighted for visibility and security, illumination-insensitive plants should be favored. City tree-planting and light-installing agencies, with a little coordination, can avoid the planting of sensitive species where higher-powered lights are destined to be placed.

If a tree is to be planted near street lights, it is well to plant in the autumn rather than in the spring in order to permit a full-season cycle of growth and adjustment before the street lighting disturbs its phytochrome-regulated growth habit. On the other hand, when new lights must be installed next to sensitive trees, it ought to be possible to install shields that direct the light away from the trees and down to the street.

*Concerning roses . . .*

# MORE ABOUT MILDEW

Frank A. Gilbert

Reprinted from AMERICAN ROSE MAGAZINE, September, 1978

Except for black spot, with which every rose grower is acquainted, powdery mildew is the most troublesome disease of roses. A few growers never had mildew, whereas some have never been able to control the disease. Powdery mildew is unlike black spot or rose rust in that the fungus threads (mycelium) of mildew do not spread through the leaf or stem but occur as whitish wefts or masses on the surface of the leaves or extremely young stems. So in theory, unlike black spot, mildew can be controlled as well as prevented by a fungicidal spray.

Mildew gets its nourishment from the plant on which it grows, by means of projections called haustoria which it sends into the green tissue—usually through the leaf pores, or stomates. The size and shape of these haustoria differ in different mildews. If the leaves of the host plant are mature when infected, there is little or no distortion, but if they are infected when very immature, normal development is prevented and distortion is frequently severe.

Throughout the growing season, the whitish mycelium produces millions of spores, called conidia, which are distributed by the wind, and under humid conditions are capable of spreading the disease very rapidly. Mildew is especially troublesome in the greenhouse, and in the rose garden during rainy spring weather and during foggy nights in the fall. Under dry conditions, its spread is much slower as it has been found that the conidia of at least one strain of rose mildew will not germinate at a relative humidity below 95 percent. Mildew conidia are short-lived spores and are extremely sensitive to freezing, so have no part in carrying the disease through the dormant season when the leaves are no longer on the rose plant.

In late summer, a second type of spore is found which is cold resistant, and it is the means of disease carryover in the winter. This spore, called the ascospore, is found in minute black spore cases attached in clusters to the mycelium. The spore cases which average about one-tenth of a millimeter in diameter are barely discernible without a hand lens. The ascospores germinate in the spring warmth and moisture, and continue the disease for another year.

### A Control Measure

Roses can be infected only through the leaves and very new stems that are protected by just a layer of epidermis. As soon as any corky bark tissue forms under the stem epidermis, infection there is impossible. The older, woody parts of the rose stem can provide inoculum for black spot, but never mildew. If I were troubled with mildew, I would carefully collect and burn all infected leaves in the fall, along with the top six inches or so of infected new stems. Thus, any young stem tissue that might harbor spore cases is removed.

Rambler roses are so susceptible to mildew that one can hardly find an uninfected plant. I would eradicate any rambler in the vicinity of my rose garden and, if it would not cause too much trouble, would convince my neighbors to do the same. Mildew that occurs on lilac, zinnia, and other plants not in the Rose Family cannot be made to infect roses, so should not be a source of concern to those who grow them near the rose garden.

As most growers know, rose species and cultivars differ considerably in their resistance to mildew, from those that are almost completely immune to those that are highly susceptible. There are two species of rose mildew, and each species may have several strains that differ in virulence. For rose growers who are in-

Estelle Gerard

Good spacing, good maintenance and scrupulous sanitation keep mildew at a minimum at the Brooklyn Botanic Garden.

terested, the species are *Sphaerotheca humuli,* and *Sphaerotheca pannosa. S. pannosa* is more common in Europe and *S. humuli* is the prevalent species in this country. It takes a pathologist with his microscope to distinguish between them. *S. pannosa* has also been found on peach and *S. humuli* on strawberry, but no suggestions have been made that roses not be grown near these potential hosts.

# HOW ONE ROSE GROWER COPES WITH MILDEW

Peter Malins, Rosarian at the Brooklyn Botanic Garden, notes that in New York mildew usually starts in July and is worst in August-September. Every 10-14 days during the mildew season he sprays with fungicides Phaltan or Benlate, alternating them to lessen the chance of the mildew becoming resistant to the sprays. If there is a heavy rain between regular sprays, he gives an application immediately after the rain.

Mr. Malins stresses that good air circulation cuts down on mildew, so he recommends planting rose bushes at least two feet apart in the North. Mildew is worse in the South, and a distance of three feet would be appropriate there. He also suggests that roses not be planted near shrubs, especially such traditional rose-garden accompaniments as closely clipped yews, boxwood and holly, because they block the normal flow of air that is essential for healthy roses.

All photos: F. Gordon Foster

Japanese painted fern

*There are a number of superb . . .*

# FERNS FOR ROCK GARDENS

F. Gordon Foster

Reprinted from THE GREEN SCENE, May, 1978

Today's ideal rock garden is a composite of small, rock-loving plants, all arranged in simulated natural settings to provide a beautiful and unusual area. Far from being a new concept, rock gardens originated shortly after the creation of the earth. Hardly had the waters receded when two tiny plants, alga and fungus, joined in symbiotic relationship, which has remained viable for millions of years. Flowerless and leafless, these wafer-thin lichens selected the naked rocks to establish the first known rock garden.

Ferns later evolved from lower forms of plant life to become one of the first groups of vascular plants. Today, they are a great family of about 12,000 species, making their homes from the tropics to the near-polar regions. Many small-to-medium-sized rock-loving species readily adapt themselves to rock garden settings. Although with a historical background of so many millions of years, ferns have had little or no serious application in rock gardens. In fact, some writers have listed all kinds of saxatile plants but have entirely overlooked the ferns.

If your rock garden does not have ferns, consider some of these unusual non-flowering plants. In contrast with many short-lived flowering plants, ferns retain their foliar beauty throughout the season and the evergreen species continue to be attractive until overtaken by new leaves the following spring.

Here are some species that will make a

startling display in an all-fern rock garden or will provide a subtle foliar background for your alpines.

No rock garden would be complete without at least one stone covered with the evergreen rock-cap fern (*Polypodium virginianum*). This little fern has a wide range of habitat and is fully hardy in colder areas. It prefers the quickly drained surfaces of rocks, whether it be hard quartz conglomerate or soft limestone. Leaves growing from intertwining rhizomes give the plant a dense mat-like appearance. Leaf mold and decaying pine needles seem sufficient to supply its growing nutrients.

Maidenhair spleenwort (*Asplenium trichomanes*) is just one of many spleenworts that grow around the world. This species, while found in favorable areas throughout the United States, also occurs in the British Isles and Europe where it is often seen growing from limestone mortar of old walls and foundations of cathedrals and chateaux. Actually only a handful in size, it definitely deserves a place in the rock garden. When propagating it, be guided by its natural growing conditions—limestone and old mortar.

Ebony spleenwort (*Asplenium platyneuron*) is one of the perkiest of all small ferns and in some respects appears like a miniature Christmas fern, although there is no generic relationship. It is an excellent choice where a vertical effect is desired. It is often found on limestone ridges, shale banks and common woodland soil. Try growing it in front of a light-colored stone; a mixture of coarse gravel or marble chips and humus is a recommended growing medium.

### A Few Favorites

Hart's-tongue fern (*Phyllitis scolopendrium*) has always been among my favorite rock garden ferns. Although the American species with its long, tongue-like leaves is nearly extinct, the English hart's-tongue fern and its handsome mutations are now listed in many nursery catalogs. The imported kinds have wavy, irregular leaves and in some mutations carry crested apical terminals. In England these are common in gardens large and small, and are often found growing out of limestone walls. A most thrilling fern experience for me was seeing these unusual ferns appearing from the spray-dampened wall at the base of the monument of the "Lion of Lucerne" in Switzerland. If possible, grow this species from an eroded pocket in a chunk of weathered limestone. Hart's-tongue ferns are hardy, but where the winters are severe the plants should be protected. Be alert for night-prowling slugs—they can be devastating.

Japanese painted fern (*Athyrium nipponicum, A. goeringianum* of gardens) has soft, gray-green leaves with wine-red veins and midribs. Leaves of some variants may reach 24 inches; I prefer the dwarf type that does not exceed 10 or 12 inches. All members of the *Athyrium* genus have creeping rhizomes and are prone to spread. The rate of increase of this species, however, is relatively slow, plants requiring separation only every three or four years. Plant it around a low gray-colored stone to display its colorful leaves to best advantage.

Oak fern (*Gymnocarpium dryopteris*) is small, usually 4 to 6 inches tall, resembling a miniature bracken in appearance and wandering habit. In nature it is often seen in the shelter of a huge rock and, although growing from a creeping rhizome, it never wanders from the site of the original planting. It will do best when planted next to a large, attractive rock in an open-light area in a moist, well-mulched soil, free of weeds.

### A Rare Fern

Rusty woodsia (*Woodsia ilvensis*) is somewhat rare but is now available through large growers. Ordinarily "little rusty" is found growing high in exposed and almost inaccessible places. I have found it along the upper cliffs of the Delaware River, high on Pilot Knob overlooking Lake George in the Adirondacks and on Mt. Dumpling, Alaska, at an exposed elevation of 2400 ft. Blunt-lobed leaves range between 3 and 6 inches and are light gray-green on the upper surface. Brown hairs and scales on the underside give this area a rusty appearance. Plant this fern in a deeply eroded natural niche or build up a pocket with two or three

A native of both the Old and New World, maidenhair spleenwort (*Asplenium trichomanes*) likes alkaline soil and can be trained to grow in cracks in limestone mortar.

stones to which a roughly neutral growing medium is added. Do not overwater, but guard against a prolonged dry spell.

Our native bladder ferns are widely different in size and leaf structure and, with reasonable care through dry weather, grow readily in the rock garden. The two more common species are the bulblet bladder fern (*Cystopteris bulbifera*) and the fragile bladder fern (*C. fragilis*).

The name "fragile" is misleading as this little fern, ordinarily not exceeding 10 inches, is one of our most rugged species. It is the first fern to appear in the spring, and is often overtaken by a late winter snowfall. Plant several of these so they may peek out from between the stones of a border. This fern disappears during very dry weather, quickly returning after a refreshing shower or two.

Bulblet bladder fern has long, pendulous leaves; I have measured some in my garden 5 inches wide at the base and 42 inches long. In addition to reproducing sexually by its spores it also reproduces asexually by little pea-like bulbils on the underside of the leaf. These drop to the ground and start new sporophytes during the same season. While a native of damp limestone walls and outcroppings, this species will tolerate ordinary garden soil. As a suggestion, add chopped oyster shells or bits of old concrete to the soil; both give a slow alkaline release and improve drainage.

Purple cliffbrake (*Pellaea atropurpurea*) normally is found growing from tight crevices of outcropping of limestone. It has unfernlike leaves of soft, gray-green texture. They sometimes grow as high as 18 inches, but garden specimens rarely exceed 10 inches. In keeping with all brakes, the outer edges of the

The ebony spleenwort (*Asplenium platyneuron*), like its cousin above, is quite small and ideal for a rock garden with neutral-to-alkaline soil.

leaflets are reflexed, partially covering the spore cases beneath. In milder areas this fern is evergreen.

Our native walking fern (*Camptosorus rhizophyllus*) is an unusual fern with its "walking" habit and is also one of the most difficult to grow. Evergreen leaves are simple, long tapering, 4 to 12 inches in length. In nature it limits its habitat to the vertical faces of limestone cliffs where good drainage is assured. In nature it grows in limited sunshine or all-day open light and shuns full shade. Snails and slugs are a perpetual nuisance. Walking ferns reproduce in two ways—sexually through their spores, and asexually by vegetative growth from their apical tips. The latter is far more common in nature and may be seen in garden-grown plants.

### An Easy Fern

*Polystichum* is a genus having world-wide distribution. Some species have leaves that are 1-pinnate, others have leaves 2- or 3-pinnate; all have in common prickly endings of their ultimate leaf segments. In England this group is referred to as prickly shield ferns; in America they are known as holly ferns. All of them are attractive and easy to grow. A moist, well-drained stony leaf mold or compost is the suggested growing medium.

Christmas fern (*P. acrostichoides*) is fully evergreen and can be grown as a bold clump. It is first seen in the spring as a group of silvery-white croziers arising from last year's prostrate green leaves.

Braun's holly fern (*P. braunii*) deciduous, and the mountain holly fern (*P. lonchitis*) an evergreen, are very rare and should only be obtained from nurseries specializing in spore-grown plants. Both plants grow in cooler areas and must be kept as cool and moist as possible during hot weather. Protect each species with sufficient mulching to prevent spring heaving.

I am particularly fond of an English species, *P. setiferum*, also known as a hedge fern. In addition to having the usual holly-like characteristics of the others, it also bears little ferns on the upper side of the leaf near the base. These live-bearing leaves may be cut and pinned to a damp growing medium to obtain more plants. Growing them under fluorescent lights makes a good winter horticultural project.

At present, my all-fern rock garden is in Sparta, New Jersey, on a rocky, hilly area overlooking Lake Mohawk in the northwest corner of the State. Here the elevation is 1,100 feet and winter temperatures occasionally drop to −20°F. To say that my rock garden is carefree would be misleading—like all gardens it requires weeding, watering and mulching. I have found, however, that my efforts are well rewarded as each day I follow the growth of these fascinating plants.

### Suggested Reading

*Ferns*, Handbook 59, Brooklyn Botanic Garden.
*Rock Gardens*, Handbook 10, Brooklyn Botanic Garden.

# THE STORY OF THE ANEMONE

Most botanically inclined *Plants & Gardens* readers know the story of Professor von Wolfgangerstrasser of the Berlin Botanischer Garten, the famous student of the genus *Anemone*, but it bears repeating from time to time. It seems that the good professor would study these plants in the herbarium for hours, classifying and reclassifying them, often to the wee hours of the morning. One evening several of his colleagues convinced him it was time to take a break, so they went to dinner and had more than a modest quantity of liquid refreshment. A great deal of conviviality ensued, and at the end of the evening Professor von Wolfgangerstrasser smilingly turned to his colleagues and said: "With friends like you who needs anemones?"

*A reminder that some . . .*

# HERBS CAN BE HAZARDOUS

Jane E. Brody

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An elderly couple from Chehalis, Washington, had been to a health spa that recommended comfrey tea as an herbal remedy for their arthritis. The wife picked what she thought was comfrey and prepared tea, which the couple drank with lunch. Within an hour they were overcome with nausea, vomiting and dizziness.

The husband discovered that what his wife had picked was not comfrey but a similar-looking plant called foxglove, the source of the toxic heart drug digitalis. By the time the ambulance arrived, his wife was dead and his own heart rhythm was so unstable that hospital treatment could not save him.

Three young women with an interest in health foods bought senna tea as an herbal substitute for ordinary tea and coffee. They suffered such severe diarrhea after drinking just one or two cups that they required emergency medical treatment. They hadn't realized that senna tea, a strong laxative, is a common folk remedy for constipation.

A 30-year-old man who avoided alcohol, cigarettes, coffee and other psychoactive drugs began taking daily capsules of "Gotu Kola" after reading an ad describing the herbal preparation as a general tonic and a "brain food" helpful in treating mental and nervous disorders, memory problems and ulcers. After three weeks he became chronically nervous and unable to sleep. The preparation was found to consist of ground kola nuts, containing pharmacological doses of caffeine.

Herbal preparations, used for 5,000 years as medicines and tonics and still the mainstay of folk remedies throughout the world, are enjoying a surging revival in the United States. Many people, disillusioned with or distrustful of modern medicine, have turned to them in an attempt to cure whatever ails them or to "preserve" their health. Others, concerned about the possibly harmful effects of coffee and ordinary tea, have switched to supposedly healthier or safer herbal teas, dozens of which are now widely sold in health food and other stores. These amateur "naturopaths," unaware that herbal teas may contain any number of potent chemicals that can disrupt the normal functions of body and mind, are often unprepared for the consequences of their innocent foray into the plant kingdom.

While such dramatically ill effects as those described above are not very common, increasing numbers of cases of herbal toxicity have come to the attention of health professionals in recent years.

Those cases that are recognized medically are believed to represent the tip of the iceberg. It is not known, for example, how many people risk their health by abandoning prescribed medications in favor of herbal remedies or who use herbal preparations that interfere with the effectiveness of needed drugs.

Some chemicals in herbal teas can cause such abnormal effects as increased blood pressure or lowered blood sugar. Tannin-rich teas, which include a number of herb teas, have been linked to an increased risk of developing cancer of the esophagus.

### Foods or Drugs?

Although they are sold as foods and thus not subject to Federal drug regulations, "herbal teas are drugs, not foods," says Dr. Ara Der Marderosian, professor of pharmacognosy at the Philadelphia College of Pharmacy and Science. "They are," he said, "crude complexes containing many impurities and active components with a variety of possible undesirable effects. Some are actually too dangerous to be used at all."

Roche

Jimson-weed (*Datura stramonium*) contains particularly toxic chemicals and should never be ingested in any form. On the plus side this nearly-ubiquitous plant produces spectacular flowers, three to five inches long, that will unfold from a tight roll in the course of a summer afternoon.

Dr. Der Marderosian pointed out that because the active constituents are generally present in very low concentrations, moderate consumption of herbal teas rarely presents a problem for the healthy. But, he continued, the concentration of active ingredients can vary widely, depending on the growing conditions of the plant, the parts of the plant used and the way the tea is brewed.

In addition, some people think that if something is good for you, more is better, and as a result they may consume enough of the active herbal ingredients to produce a toxic effect. "These are not substances to be used frivolously," Dr. Der Marderosian warned.

Dr. Der Marderosian should know. Pharmacognosy, his specialty, is the science of drugs of natural origin. At one time all drugs came from natural products, for the most part plants. Even now, 47 percent of prescription drugs sold contain active ingredients extracted from plants.

Among them are digitalis; reserpine, a tranquilizer and blood pressure-lowering agent from snakeroot; quinine, an antimalarial drug from the bark of the cinchona shrub; atropine, a powerful alkaloid with many effects extracted from deadly nightshade (belladonna); ephedrine, a nasal decongestant and central nervous system stimulant from the shrub ephedra; colchicine, a drug to treat gout, its source meadow-saffron; ipecac, from the root of a South American plant, used today to induce vomiting and to treat amoebic dysentery, and kainic acid, from red seaweed, used by the Japanese to treat intestinal parasites.

### Reputed Remedies

Fewer than half the plant compounds of possible pharmacological value have been identified and even fewer have been tested for effectiveness. Nonetheless, the herbal folklore is replete with reputed remedies.

Although the packages and advertise-

George Taloumis

American mistletoe, a parasite here shown on hickory, contains toxic proteins that can interfere with normal liver function and blood development.

ments for herbal teas and capsules cannot legally make claims for their health value—that would subject them to the laws of the Food and Drug Administration—often on shelves right next to these herbal products are stacks of books, pamphlets, magazines and charts describing the supposed health benefits of herbs.

Herbs of one sort or another are said in this literature to be capable of curing everything from acne, alcoholism and allergies to hemorrhoids, miscarriage and ulcers, all without any adverse side effects.

It is true that many plants contain substances that can, in sufficient quantity, alleviate some of these conditions. It is also a fact, however, that these substances are really drugs, not foods, and that all drugs can have dangerous side effects.

Because herbal compounds sometimes counter the effects of drugs prescribed by doctors, Dr. Alvin B. Segelman, pharmacognosist at Rutgers University, advises people who are taking prescription drugs to avoid herbal teas.

People with chronic ailments should tell their physicians of any use of herbal preparations. People who try to treat themselves herbally, Dr. Der Marderosian says, may make a number of unwarranted and possibly dangerous assumptions—that they know what's wrong, they know the strength and composition of the herbal preparation, and that there are no side effects from herbs.

"People don't realize that herbal preparations were once available only in pharmacies," Dr. Der Marderosian said. "They were used as drugs and the druggist would tell the purchaser how to prepare them to get the desired effect.

"Now it's very difficult to get reliable information about the effects of herbs. The literature in health food stores may be peppered with a little truth, but on the whole it is very dubious. To really know what's in herbal teas and what is safe, you have to take a specialized course like pharmacognosy or study a textbook on the subject."

### Mistletoe, Sassafras and Others

A number of field guides to edible wild plants are available, but Dr. Der Marderosian cautions: "No one should pick and eat wild plants without having first taken a course or read an authoritative book and gone out with a knowledgeable collector." Dr. Segelman advises consulting first with your community pharmacist about the safe use of herbal medicines.

Some medicinal teas are too dangerous to be on the shelves of any food store, according to Dr. Der Marderosian. Among them are mistletoe, a "calmative" that contains toxic proteins that can produce anemia and hemorrhage in the liver and intestines; shave grass (horsetail or equisetum, a diuretic and dyspepsia agent), which has toxins that can produce severe neurological reactions; and sassafras tea (made from sassafras root bark), which contains safrole, an established cause of cancer and a potent inhibitor of certain liver enzymes.

Other herbal preparations can have severe and terrifying effects on the mind. Some contain psychoactive compounds, including stimulants, hallucinogens, narcotics, sedatives or euphoriants. A 37-year-old woman who drank nutmeg tea became incoherent, giddy, flushed, dizzy and had frightening hallucinations. A young man who drank a tea made from jimson weed suffered hallucinations and became totally disoriented, wandering in the woods barefoot, cutting his feet badly and lighting fires to scare off the "voodoo people."

Dr. Ronald K. Siegel, pharmacologist at the University of California at Los Angeles School of Medicine, who reported these two cases of herbal intoxication and five others, cautioned doctors to ask their patients about the use of herbal preparations whenever investigating the origin of any medical complaint.

## *THE GARDENER'S PRAYER*

**O Lord,** grant that in some way it may rain every day,
say from about midnight until three o'clock in the morning,
but, You see, it must be gentle and warm so that it can soak in;
grant that at the same time it would not rain on campion,
alyssum, helianthemum, lavender, and the others which You
in Your infinite wisdom know are drought-loving plants—
*I will write their names on a little piece of paper if You like—*
and grant that the sun may shine the whole day long,
but not everywhere *(not, for instance, on spiraea, or on gentian, plantain lily, and rhododendron),* and not too much;
that there may be plenty of dew and a little wind, enough worms,
no aphids and snails, no mildew, and that once a week
liquid manure and guano may fall from heaven. AMEN.

Karel Čapek

*Photos: Discovering Ikebana*

*Confrontation of cultures . . .*

# IKEBANA IN THE WEST

Katsuko Arimura and Charles Swezey

(Reprinted with permission from the authors' book *Discovering Ikebana.**)

When the garden club movement began in the United States, about fifty years ago, flower shows followed naturally, and the interest in artistic displays led to the discovery that the orientals, especially the Japanese, had for centuries been perfecting the art of flower arrangement. So Japanese teachers and textbooks became popular in the United States.

Purely Japanese arrangements, however, often seem out of place in American homes. Sometimes, the designs and materials are not well chosen: a modest Chabana, for instance, will look weak and colorless in a majestic room. But the real problems lie deeper than this. In spite of efforts to match them, the ikebana and the setting may seem to express two different cultures that do not harmonize.

In making ikebana also, a Westerner is apt to say that he cannot get the "feel" of it. After reviewing the rules and principles, he still cannot "put his finger" on what is wrong. Somehow, it involves his whole background and personality.

Cultural differences like these can be disturbing and hard to define. For our attitudes and ways of thinking are often formed unconsciously—simply absorbed from the backgrounds in which we grew up. Each of us tends to take his own culture for granted; it does not occur to him that others may not think and feel the same way. So, whenever East meets West, the questions that remain unasked and unanswered are apt to be those that could help us the most in understanding how we react.

I have three questions in mind that apply especially to the ikebana in your living room. They appear to be so simple that I apologize for asking them, yet I cannot answer them adequately without your help. After ten years in America, there is too much that I do not understand about the West. My questions are, "What is a flower?," "What is an arrangement?," and "What is Nature?"

If we take these questions seriously, I

*A 40-page soft-cover book available from The Garden Shop, Brooklyn Botanic Garden, Brooklyn, N.Y. 11225. $3.50 (includes postage).

think they will lead us toward a better realization of what ikebana is "for," what each of us can "do" with it, and what it can mean for people everywhere—East and West. I shall have to respond chiefly in terms of my background in Japan. I hope you will not agree with me completely, for it takes different notes to form a harmony.

### What is a Flower?

To my astonishment, I find that I am using the word in a way that is not accepted in my English dictionary. For me, it can mean not just a blossom or an "ornamental," but practically any plant that produces life from the sunlight and the soil.

In the Japanese tradition, the whole plant had a profound significance as a source of spiritual inspiration as well as physical survival. In fact, every plant had a personal life of its own. With compassion and gratitude, the flower arrangers dedicated annual memorial services to the plants that had been sacrificed to the art.

With such a background, it is only natural that the Japanese should handle plants with great respect and find in flower arrangement a much deeper meaning than mere decoration. In ikebana, they have become a medium for seeking truth and understanding nature.

People in the West also cherish flowers, but I think it is usually for different reasons—perhaps because flowers are beautiful in themselves, because they symbolize special events or human relationships, because they make such colorful decorations, etc. Relatively few Westerners seem to share the basic attitude of the Japanese, and unless you can do so, copies of classical ikebana will not really be at home in your living room.

This does not mean that ikebana is "not for you," for it is where we differ rather than where we agree that we have the most to offer to each other. If I am not wrong, my next question will suggest some qualities—perhaps even a new "dimension"—that you may want to add to your own flower arrangements.

### What is an "Arrangement"?

Traditional Japanese music often sounds "all wrong" to Americans. The notes seem a little too high or too low because they do not fit on the scale that Westerners take for granted as the basis of musical composition. The scale, of course, is an artificial arrangement of notes determined mathematically by the number of vibrations per second. But the early Japanese musicians had no scale. They sought only to render faithfully the sounds of nature—like the roar of the ocean and the whispering of the wind in the trees.

The same basic difference is often found between ikebana and Western floral arrangements, for in Japan, beauty

Here in the semi-formal *Shoka* style red roses and pyracantha are combined in a two-story container.

Stylized elegant *Shoka* in the traditional design *Heaven, Earth and Man* symbolizes the natural growth of whole plants and their gift of life to man from sun and soil.

meant natural beauty. Definite rules evolved, but their purpose was to blend art and nature. Let us consider a few reasons why a Westerner may feel that ikebana does not "look right" to him.

1. "It is not symmetrical." The primary pattern for ikebana consists of three lines of different lengths—a main stem and two branches—to suggest the natural posture of a plant reaching toward the sun. In slow graceful curves, a subtle balance is achieved, not a static balance of weights and measures, but the dynamic balance of growth and harmony. The pattern symbolizes the vital relationships plants provide between heaven, earth, and man.

2. "It seems so plain." To the Western eye, traditional ikebana may lack color and the interest of complexity. But the Japanese avoid exaggerating the color effects in nature and seek to understand nature by concentrating on essentials. According to Zen, color can be an obstacle to real comprehension. It not only complicates the design but limits the imagination; it is like seeing a movie instead of reading a book.

3. "It is incomplete." If you are looking for a "finished" work of art, you may be disappointed in ikebana. In the Zen philosophy nothing is perfect in the world, and completeness in art is fatal. The composition should invite the viewer to complete it in his own mind, for this is the only way in which he can discover truth and beauty. "If you tell everything," says the poet Basho, "the poem loses its charm."

4. "It seems empty." There is apt to be more open space in ikebana than in Western arrangements, not only to give the viewer room to "move around" mentally, but also because flowers need air in which to live and grow. Much of the vitality of ikebana comes from adding to the three static dimensions (length, breadth, and thickness) a fourth one, something like the time-space dimension of the scientists, that starts here and now and leaves room for growth. Perhaps I should simply call it spontaneity or a sense of life.

5. "It's unpredictable." There is an element of surprise in ikebana; no two arrangements are quite alike. This can be unsettling to anyone who wants to predict results and know exactly what to expect. The oriental mind tends to welcome the unexpected and feel that each flower arrangement should be a new adventure both for its creator and for its viewers.

I hope I have not been prejudiced in my comments on "arrangements," for my only purpose is to suggest some "notes" that ikebana might add to the Western "scale" of flower arrangement. How they will harmonize depends on how we respond to my last question.

**What is Nature?**

Traditionally, the Japanese built their

*Moribana*: free style
Sago-palm fronds compose the three main lines.

The filling, acalypha, adds color and interest.

Movement is created by adding dried bleached wisteria vines.

homes open to the outdoors, with trees and flowers practically within arm's reach. Despite the annual visits of the typhoons, they rebuilt with the same fragile type of architecture, year after year. The thought of any separation from nature was inconceivable, for these people were part of it. In their pantheistic religion, they shared a spiritual life with plants and animals. Nature was the center of all reality and the central theme in all their art.

Much of this traditional attitude survives today in forms like ikebana whose rules were designed as avenues to a greater appreciation of the universal life process. Ikebana is nature-centered and reveals a deep sympathy with other forms of life, from a tree weathering a storm to a flower growing in the sun.

Western culture, in general, has fostered a more man-centered attitude. The Bible gives him "dominion over all the earth." The heritage from Greece and Rome is one of human achievement in

which nature plays at best a subordinate part. And in the industrial revolution, plants and animals have been used whenever possible as raw materials for manufacturing the necessities and amenities of modern civilization.

I do not mean to imply that Westerners today regard their natural resources merely as a storehouse of supplies. And I have yet to find a student who would defend the idea that flowers are nothing more than raw materials. Yet, unconsciously, the man-centered attitude seems to prevent many people from finding real significance in ikebana. To me, this is tragic because it is so unnecessary.

We do not have to choose between the nature traditions of the East and West, for we seem to need both. Presented with similar choice, the English scholar I. A. Richards asked if we must use our mouths only for eating or only for speaking. In relationship with nature, we can communicate as well as consume. In this way, we find meaning in our lives through a sense of unity with universal life. Ikebana is one of the ways of doing so.

The attitude we seek is one of unself-conscious awareness in which we can "listen" to nature with the "soul" she put inside us. We must hear what flowers have to say before we can respond to them with an arrangement that is true to life. How do we listen? Simply by washing away from our minds everything that estranges us from nature—all thought of planning, manipulation and of materialism—to achieve a state of being which T. S. Eliot has described as

> Quick, here, now always—
> A condition of complete simplicity.

In Japan, flower arrangement has become such an approach to life, bringing it closer to our eyes and putting in our hands a way of feeling and expressing the quality of personal experience. Teaching ikebana involves more suggestions than instructions, for the joy of doing is more important than the appearance of the arrangement. For many years, there were no textbooks. Whenever I asked my teacher for rules and reasons, he would reply, "No. I will tell you when the time comes."

When the time comes, you can find rules and methods, if you really need them. Until that time, they may serve only to obscure or distort what is in your mind and heart. "Flower arrangement," says the Zen proverb, "is the mirror of man." For now, I can only suggest that you start in the simplest way, by "throwing" flowers into a tall vase. This can absorb you completely if you try to do what the flowers ask of you.

To me, ikebana is part of the universal quest for peace and harmony within and among us and with the world around us. Flowers are like people. We cannot possess them; they are only ours in respect and love. And they often express more than words can utter, as the Buddha knew when he was asked for a sermon and silently presented a golden lotus.

# A DIFFERENT SLANT ON CUT FLOWERS

Things are always easy when you know how. A gardener of our acquaintance who likes a few flowers on the dinner table spends a lot of time cutting stems individually to different lengths. Muriel Jaffe, Guest Editor of the Brooklyn Botanic Garden Handbook *Designing with Flowers,* saw him do this recently and took him aside. Her advice: "Place the flowers side by side on a table with a cutting board under the stems and slash diagonally through the stems from the cut end." This works especially well with gladiolus and chrysanthemums but applies to most other flowers, too. It is so obvious and simple—like the invention of the wheel.

*For accuracy make your own . . .*

# TOOLS FOR SPACING GARDEN BULBS

Robert S. Tomson

Many gardeners like to place clumps of daffodils at random for naturalistic plantings on a hillside or at the edge of a lawn, others are content to group just a few tulips in the flower border for a spot of color before annuals are set out or most perennials come into bloom. Often, however, a formal effect is desired. Let us suppose that you have a garden bed in which you want to plant five rows of bulbs, each row being 9″ from the adjacent row, and that you also want the bulbs to be 6″ apart in each row.

To mark the rows (after the garden is cultivated and raked), make a tool similar to that shown in Fig. 1. This is simply a piece of 2″ x 2″ lumber drilled for ¾″ dowels and, in this case, the dowels will be spaced 9″ apart (center to center). Set an old broom or hoe handle at an angle into the base and you are ready to "draw" the row lines by merely dragging this tool along the garden bed.

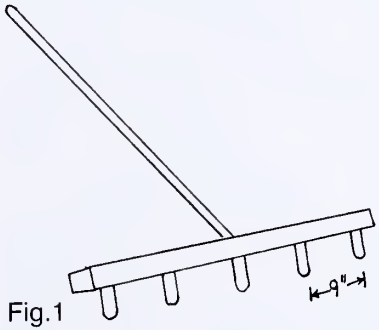



Fig.1

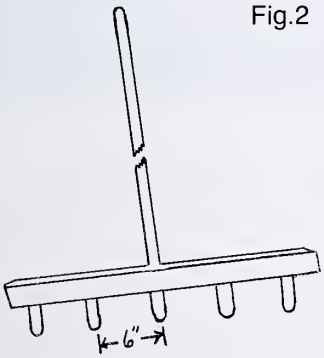
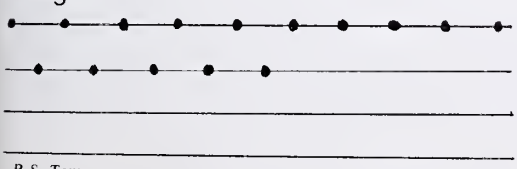



Fig.2

For actually spacing the bulbs, make a second tool similar to the first one except that the dowels will be centered 6″ apart and the old broom handle (everyone should save old broom handles!) will be set vertically instead of at an angle. (See Fig. 2) This tool will be used as a punch. Standing directly over a row line, press downward on the handle and, presto, five small holes will be made, marking the location of each bulb. (See Fig. 3) Now, all your measuring is completed. Take your trowel and plant those bulbs and they will all be accurately spaced.

At the Brooklyn Botanic Garden about six thousand tulips are planted in the Annual Borders each autumn by four or five gardeners in less than four hours using tools similar to the ones shown.

Fig.3



*R.S. Tomson*

Butterfly-weed (*Asclepias tuberosa*)

Thimble-weed (*Anemone cylindrica*)

Photos: E.M. Kittredge

# SEED DIVIDEND FOR MEMBERS

Seeds of two plants of the field are now available to Members. One is butterfly-weed (*Asclepias tuberosa*), a long-lived perennial whose bright orange flowers appear in early summer. It requires sun and good drainage. Height is 2-3 ft. This is an excellent plant for the border as well as a naturalized area.

The other "dividend" is thimble-weed (*Anemone cylindrica*), an attractive perennial that grows 1½-2 ft. tall. White, thimble-like flowers appear on long stalks in early summer. Culture and uses are essentially the same.

The seeds have been kindly made available by Dr. Samuel B. Harper, Madison, Wisconsin, who collected them in the wild. Please send seed request and stamped, self-addressed, business-size envelope to: Editor, Brooklyn Botanic Garden, 1000 Washington Ave., Brooklyn, NY 11225. Instructions for sowing will be included.

If you are not a Member of the Garden but would like to join and receive the seeds, there is an application form on the inside back cover of this issue.

*Part-time business . . .*

# CAN ORNAMENTAL PLANTS TURN A PROFIT FOR YOU?

Elizabeth Scholtz and Frederick McGourty, Jr.

Reprinted from *Living on a Few Acres*, YEARBOOK OF AGRICULTURE, 1978 (USDA)

Can you make money raising ornamental plants in your spare time? Yes, if you're a fairly experienced home gardener, are willing to work hard and to forego a financial return for at least a year or two, but don't expect windfall harvests of either money or plants although a few hobbyists eventually go into business full-time and are quite successful.

The main pleasure is not financial. It's the opportunity to work a few-to-many hours a day with living green things, toward the specific goal of attracting a following of customers by providing the plants they seek—as well as occasional specialties they will be excited to discover. There can be a modest return, enough to help offset the cost of a college education or to provide a retirement cushion.

An informal survey of part-time growers was recently conducted by the authors, and we think the results will be of interest to people wondering whether to take the plunge.

The growers we questioned are, to a person, instinctive gardeners and their satisfaction is primarily in the doing, not in monetary gain. All live in rural or semi-rural areas except one, who is a suburbanite. All except one are married, with the spouse working full time in another profession but with time to help in the raising and—at least to some extent—the care of plants.

Each grower relies on a modest greenhouse for starting his plants and is thus affected by heating costs. Such expenses are of less concern in Atlanta, where it costs roughly $350 a year to provide a 12 × 20 foot lean-to type greenhouse with all services—heat, water and electricity—winter temperatures being held at 60° to 65°F. Costs necessarily would be more in New England or other winter-cool climates.

Heating temperatures from wood stoves cannot be as closely controlled as those from oil burners or natural-gas units, but they do at least allow the spare-time grower to carry over certain mild-climate plants, such as scented geraniums, which can tolerate extremes of heat but not freezing temperatures.

One Connecticut grower with a lean-to greenhouse that doubles as a pottery workshop burns three cords of wood a winter (for night heat only, at a cost locally of about $150). The radiant heat of the sun provides adequate daytime heating, except on cloudy days. Under such conditions rugged sorts of subtropical perennials and cuttings are kept in fairly good condition.

Because of high heating costs, some semi-commercial growers in the North who depend on an oil unit choose not to start up their small greenhouses until late February. They then concentrate on popular annuals, most of which can be ready for sale in May, after thinning, transplanting and hardening off in cold frames.

In the case of a few slow-growing annuals or plants treated as such, these northerners may buy small ones from nearby wholesalers and grow them on. This method is favored with fibrous begonias and geraniums, both of which are excellent sellers in May if in flower. Good timing is essential because a late start to minimize heating costs may result in flowerless plants at peak sales time.

### Colorful Annuals

The raising and sale of colorful annuals has much to recommend it because the grower's season is fairly short, starting in

Photo: Jay S. Louden

Studio-greenhouse for Rosemary's Herbs & Pottery, a hobby business. The addition, which is heated by a wood stove, hosts sunny-day pottery lessons and spring-evening classes on herb propagation. It was built by Jay S. Louden for his wife.

the North in late February and ending about July 1. During this period the grower cannot be away from home overnight unless someone is on hand to maintain the heat and tend the plants.

Because the spare-time grower works on a small volume and margin, it is usually not feasible to hire outside help. Even if it were, some growers report, the bookkeeping involved may rule against it.

Standard annuals, the ones customers know best, are usually dependable sellers provided they are in bloom at selling time. These include marigolds, petunias, salvia and zinnias. Begonias and impatiens, though more costly to raise, always seem the first to sell out.

There is a smaller market for hardy perennials, but it should not be ignored as an adjunct to sales, particularly if they are kinds brought into bloom during the peak selling season. These include columbine, bleeding-heart, delphinium, certain phloxes and bearded iris.

An important consideration is that hardy perennials can be grown exclusively in cold frames and do not require a heated greenhouse, though the latter can spur early-spring growth or serve as a propagation aid.

One Massachusetts grower, who does not have a large enough retail market to justify extensive raising of hardy perennials, concentrates on growing them for resale to garden centers and small nurseries. With cold frames and an acre

of land for field growth, overhead costs are relatively small. The main expense is his time and labor, especially at plant-division time.

The growers surveyed stressed that it is essential to raise plants customers want, which are not necessarily personal favorites of the grower. Other advice consisted of starting on a small scale, first getting to know both plants and their market potential, and reinvesting all profits in the business during a building-up period.

Growing too many kinds of plants can be disastrous, the only beneficiary being the grower's own garden. It is better to sell out of a plant quickly than to have leftovers, although the grower can sometimes dispose of leftovers toward the end of the season by contracting to plant other people's gardens. It does no harm to have a small landscape-consultant business on the side.

### "Corner a Market"

Spare-time growing of house plants for sale can be moderately profitable, particularly in mild-winter parts of the country. A Georgia housewife, for example, who finds it most practical to be a small wholesaler, gives this advice: "If you want to make money at it, you must corner a market and be prepared to produce at the most inconvenient time. Learn to grow for the demand of the season. The best example I know is a man who learned to grow piggyback plants (*Tolmiea menziesii*) so well that he supplied the local market exclusively.

"Go to retailers, ask them about their needs and the prices they would like, and try to provide for that. Don't attempt to compete with Florida growers of foliage plants unless you can raise them better or more cheaply. Instead, concentrate on plants that the big wholesalers have overlooked or disdained because they require special care, but for which there is a market. Plants such as African-violets are always in demand.

"Small mail-order businesses are feasible for certain kinds of plants. One woman here has a substantial volume selling hoyas by mail, along with plant accessories. Be careful to advertise at first in free papers and magazines or small local newspapers. The cost of advertising in large newspapers is phenomenal."

Regardless of where you live, there are practical matters to settle before engaging in a part-time business selling plants.

First, find out what the local zoning regulations are and what permits are needed. Many of the greenhouses of semi-commercial growers were already on their sites as hobby units, but their uses may be stipulated by law.

Building permits may be necessary for lath houses or other structures. Parking availability and even the size of signs are considerations, too. In case you plan to use restricted pesticides, you will need an applicator's license (see your county extension agent).

A sales tax number obtainable from the state will allow you to buy wholesale.

It's also a good idea to have a bookkeeper if you're not handy at accounting. Bear in mind the tax advantages: it is possible to depreciate the cost of a greenhouse and also to take tax deductions for a business phone, office space and furniture, utilities and other items of expense related to the business.

# HORTICULTURAL CALORIE COUNT

Reprinted from THE GARDENER (Men's Garden Clubs of America), May-June, 1978

Gardening is a waist-shrinker, a weight-reducer, a sleep-inducer. Working in the garden is nature's painless way to keep the waistline down. Did you know you can use up more calories per hour gardening than you do by cycling or walking? Figures from the University of Illinois: Bicycling uses 210 calories per hour; so does walking, but gardening uses 220 and lawn mowing (hand or push), 370 calories. Ditch digging uses 400 and this is similar to spading.

*When potting house plants . . .*

# DON'T SQUEEZE THE SOIL MIX

R. W. Henley

Reprinted from LONG ISLAND HORTICULTURE NEWS, July, 1978

Regardless of the techniques used in potting house plants, an important objective is to produce plants with healthy and extensive root systems. Although many factors determine the rate of growth and quality of root systems, one factor—compaction—is often underestimated.

The results of the study reported herein are not new to experienced horticulturists, but they do illustrate the effect of soil compaction on plant growth.

Two tropical foliage plants with fibrous roots were selected—satin pellionia (*P. pulchra*) and panamiga (*Pilea involucrata*). A medium consisting of equal parts sphagnum peat and perlite was placed into small square plastic pots measuring 50 mm (two inches) across at the lip. Fifty unrooted cuttings of each species, approximately 50 mm in length, were stuck directly into the potting soil. Soil around the stems of half the plants of each species was firmed to assure cuttings would not shift as they were transported from the potting area to greenhouses. Sufficient soil was added to bring the level of compressed soil to just below the container lip.

A second group of cuttings was stuck in pots containing loose soil filled to the lip of the container and leveled. Fertilizer was applied periodically with irrigation water.

The experiment was initiated May 24 and final measurements of growth were taken July 25. Average values from twenty-five measurements per treatment are presented in Table 1. Root depth was measured along the side of the root ball and top growth is the length of the longest shoot in each container.

The influence of soil compaction

Soil compaction can be the result of over-zealous root production, as was the case with this spider plant.

Photos: George Taloumis

A container-grown Japanese red maple has no room for root expansion. Both the too-small container and the compacted soil are imparing its growth. Poor aeration and water movement can mean root burn and root drowning, with eventual death of the plant. Below the repotting. Note how friable the soil appears.

Indoor plants deserve soil similar in texture to good garden loam, but even a bit looser to allow good root growth within the limitations of a container. The addition of perlite, vermiculite or other artificial media to potting soil will help to prevent compaction, as will good bottom drainage.

greatly affected shoot and root growth. Root penetration of the two species growing in non-compacted soil was approximately four times greater than plants growing in compacted soils. Shoot length was 50% greater on plants growing in non-compacted soil. Measurements were also made on the dry weight of soil in each container and the moisture held by the two treatments. Pots containing the compacted soils contained 1.5 times more soil mix than non-compacted soils. When containers were watered, compacted soils held 1.3 times more water than containers containing non-compacted soils.

**Table 1.** Influence of soil mix compaction on the subsequent growth of two foliage plants

| Plant | Soil Treatment | Root Depth (mm) | Shoot Growth (mm) |
|---|---|---|---|
| *Pellionia pulchra* | non-compacted | 21.4 | 57.2 |
| | compacted | 5.0 | 35.2 |
| *Pilea involucrata* | non-compacted | 30.3 | 40.8 |
| | compacted | 8.2 | 29.7 |

From the data presented above, the advantages of potting into relatively loose soil can be appreciated. The only compaction used with the loose soil treatment was through initial overhead waterings.

*Lesson:* For best plant growth and efficient use of potting soil, don't squeeze the soil mix too much.

# FERTILIZERS FOR HUNGRY HOUSE PLANTS

Reprinted from PLANTS ALIVE, July, 1978

Your house plants need at least sixteen elements for growth and good health.

Carbon dioxide in the air and in water provides three of the sixteen elements: carbon, hydrogen and oxygen. All others must come from the soil or fertilizers. These include relatively large amounts of the three major nutrients: nitrogen, phosphorus and potassium; smaller quantities of the minor nutrients: calcium, magnesium and sulphur; and minute quantities of the trace elements: iron, manganese, zinc, copper, boron, molybdenum and chlorine.

A house plant that is never fertilized nor repotted will probably run short of nitrogen first, then potassium and eventually phosphorus.

In general, fertilizers rich in nitrogen are used to build foliage, phosphorus to promote blossoming and potassium to encourage root production, sturdiness and disease resistance.

Nitrogen deficiency shows up in pale or stunted leaves, loss of older leaves and poor overall growth. Too little phosphorus results in sparse or faded blooms and weak stems. A shortage of potassium causes leaf loss and spindly growth.

All fertilizer labels display a set of three numbers, such as 12-6-6. The first number always reveals the nitrogen (N) content, the second, phosphorus (P), and the third, potassium (K). The N-P-K numbers 12-6-6 tell you that a fertilizer contains 12 percent nitrogen, 6 percent phosphorus, and 6 percent potassium.

Ordinarily, N-P-K is what you're buying in a fertilizer. If a 12-6-6 fertilizer costs the same as the same quantity of 6-3-3 fertilizer, the one with higher N-P-K numbers is probably a better buy.

Many fertilizers do not list trace or minor elements on the label. This may mean they don't have them, or it may mean they have them in amounts too small to list but still beneficial to your house plants. Switching fertilizer brands from time to time increases the chances of getting a variety of trace elements.

### Which to Use?

Natural or synthetic; quick-acting or timed-release; liquid, dry mix, spray, capsule or spike—house plant fertilizer sales are a $35 million, fast-growing business, with new products appearing all the time. Deciding which fertilizer to feed your house plants can be bewildering.

You can fertilize your house plants using only natural or organic plant foods if you wish. Fish emulsion, for example, contains 5 percent nitrogen; bonemeal, 20 percent phosphorus; wood ash, about 5 percent potassium. Natural fertilizers like compost, manure, alfalfa leaves, or seaweed are likely to be rich in the minor and trace elements your plants need, and their effects will be long lasting.

The traditional objections to natural fertilizers for house plants have been that they are less convenient than prepackaged synthetics and that their rate of nutrient release is slow and unpredictable. Neither objection holds up today, especially due to the rapid development of new commercial organic plant foods.

Fish emulsion, which has always been quick acting, now comes in pre-measured capsule form. Seaweed is available in ready-to-use foliar sprays. Almost every visit to the house plant fertilizer shelf of a garden center these days will reveal new "balanced" fertilizers, derived entirely from grains or other natural sources, in a variety of N-P-K formulations rivaling those of the synthetic fertilizers.

Synthetic water-soluble fertilizers, in liquid or dry forms, have always been easy to use. If your house plant shows signs of nutritional deficiency, quick-acting synthetics can correct it fast. Because manufacturers assemble these fertilizers from chemicals in the factory,

| BRAND NAME | N-P-K | TRACE ELEMENTS LISTED | FREQUENCY OF APPLICATION | HOW APPLIED |
|---|---|---|---|---|
| **CAPSULES, SPIKES, SPRAYS AND TIMED-RELEASES** | | | | |
| Alfa Grow Organic Plant Food | 3-0-2 | — | monthly | bury in soil |
| Dramm Mini-Pill | 14-4-6 | — | 4 months | on top of soil |
| Grow-All Fish Emulsion Capsules | 7-2-1 | — | 2 months | bury in soil |
| House in Bloom | 7-7-7 | — | 3-4 weeks | spray onto soil |
| Jobe's Houseplant Spikes | 12-6-6 | — | 2 months | bury in soil |
| Ortho African Violet Food | 6-9-5 | 8 | 4-6 months | work into top of soil |
| Ortho General Purpose Plant Food | 12-6-6 | 8 | 3-4 months | work into top of soil |
| Ortho Pot and Planter Food | 5-10-5 | 8 | 4-6 months | work into top of soil |
| Osmocote | 14-14-14 | — | 3-4 months | mix into potting soil |
| Osmocote | 18-9-13 | — | 3-4 months | on top of soil |
| Plantabbs | 11-15-20 | — | 1½-2 weeks | dissolve in water |
| Plantabbs Terrarium Food | 18-6-12 | — | 12 months | sprinkle on soil |
| Precise African Violet Food | 8-11-5 | — | 4-6 months | work into top of soil |
| Precise Flower Food | 6-12-6 | — | 4 months | work into top of soil |
| Precise Plant Food | 12-6-6 | — | 3-4 months | work into top of soil |
| Roto Grow | 9-9-9 | 6 | 2-3 months | bury in soil |
| **LIQUID CONCENTRATES** | | | | |
| Agro Fish 'n Six | 14-6-8 | 6 | 2-3 weeks | dilute in water |
| Cole's House Plant Food | 10-10-5 | 3 | every watering | dilute in water |
| Cole's 100% Organic (from seaweed) | 0.28-0.02-0.07 | — | — | foliar spray |
| Cole's Tender Leaf Bloom | 0-10-10 | 3 | every watering | dilute in water |
| Dr. Sher's Gourmet Food for Plants | | | | |
| African Violet Diet | 6-5-5 | 8 | every watering | dilute in water |
| Foliage & Leaf Diet | 15-5-5 | 8 | every watering | dilute in water |
| Summer Balanced Diet | 10-15-10 | 8 | every watering | dilute in water |
| Winter Balanced Diet | 5-15-10 | 8 | every watering | dilute in water |
| Eco-Gro Fish & Seaweed Fertilizer | 8-4-4 | — | 3-4 weeks | dilute in water |
| Fish emulsion (Atlas, Green Garde & similar brands) | 5-1-1 | 1 | 2-3 weeks | dilute in water |
| Granny's Bloomers African Violet Food | 0-6-5 | — | 2 weeks | dilute in water |
| Jungle Juice | 2-5-4 | — | 2 weeks | dilute in water |
| Liquinox Bloom | 0-10-10 | — | 3-4 weeks | dilute in water |
| Liquinox Grow | 10-10-5 | — | 2 weeks | dilute in water |
| Ortho House Plant Food | 5-10-5 | 3 | weekly | to soil |
| Ortho Liquid African Violet Food | 6-9-5 | 3 | 2-4 weeks | to soil |
| Schultz-Instant Plant Food | 10-15-10 | — | every watering | dilute in water |
| Stern's Liquid Miracle-Gro | 8-7-6 | 1 | weekly | to soil |
| Stern's Miracle-Gro Therapy | 10-8-7 | 1 | monthly | dilute in water |
| Tootsizer House & Garden Plant Food | 12-8-4 | 1 | 2 weeks | dilute in water |
| **DRY MIXES** | | | | |
| Agro Aqua Feed | 20-20-20 | — | — | foliar or in water |
| Eco Grow | 10-8-14 | 12 | 1-3 weeks | dissolve in water |
| Hyponex House Plant Food | 7-6-19 | — | weekly | dissolve in water |
| Miller's Booster House Plant Formula | 5-10-14 | 9 | 7-10 days | dissolve in water |
| NuLife Soluble Plant Food | 20-20-20 | — | weekly | foliar or in water |
| Orchid Spoonit | 30-10-10 | 1 | monthly | dissolve in water |
| Plant Marvel | 12-31-14 | 7 | every watering | foliar or in water |
| Ra-Pid-Gro | 23-19-17 | — | 2 weeks | foliar or in water |
| Restore African Violet Formula | 3-5-4 | — | every watering | dissolve in water |
| Restore Foliage Plant Formula | 3-4-4 | — | every watering | dissolve in water |
| Spoonit Plant Food | 18-20-16 | 1 | monthly | dissolve in water |
| Stern's Miracid | 30-10-10 | 4 | 2-4 weeks | foliar or in water |
| Stern's Miracle Grow | 15-30-15 | 4 | 2-4 weeks | foliar or in water |

Damage to foliage of white-veined fittonia from overfertilizing can appear the same as when the plant is allowed to wilt from underwatering. This is due to root burn from too much fertilizer in the soil-water.

*George Taloumis*

they can be obtained in just about any formula.

On the minus side, it's all too easy to overdose your house plants with concentrated synthetic fertilizers. Then too, the effects of quick-acting fertilizers are just as quickly gone, so that frequent application is usually necessary. Trace elements other than those listed may be absent.

### Quick or Slow?

Timed-release synthetics are big news in house plant foods today. In most, nutrients are locked up inside a coating which slowly dissolves with each watering so that fertilizer is released into the soil over a period ranging from a month to a year.

Read the label carefully, however. Some time-release fertilizers, instead of using a coating, derive their nitrogen component from urea formaldehyde. Urea formaldehyde slows down the release of nitrogen without slowing phosphorus or potassium in any way.

This could conceivably result in relatively heavy doses of phosphorus and potassium shortly after application, followed by unbalanced release of nitrogen later on. A timed-release formula depending on a biodegradable coating to slow nutrient release might have a more consistently balanced delivery.

Keep in mind that temperature, moisture or physical damage to the coating can vary the rate of release. Even with a good timed-release fertilizer, you will still want to keep an eye on your house plants. Their condition is your best indication of when and what to feed.

Timed-release fertilizers have a tremendous advantage for commercial growers, who can pop a capsule into each pot at the nursery and know the plant will still look lush and healthy several weeks later on a retailer's shelf. Some house plant owners, as well as many commercial growers, use timed-release fertilizers in combination with quick-acting liquid feeding to allow greater day-to-day control of plant nutrition. Which system or combination of feeding systems works best for your house plants depends in part on just how close a watch you like to keep on your plants.

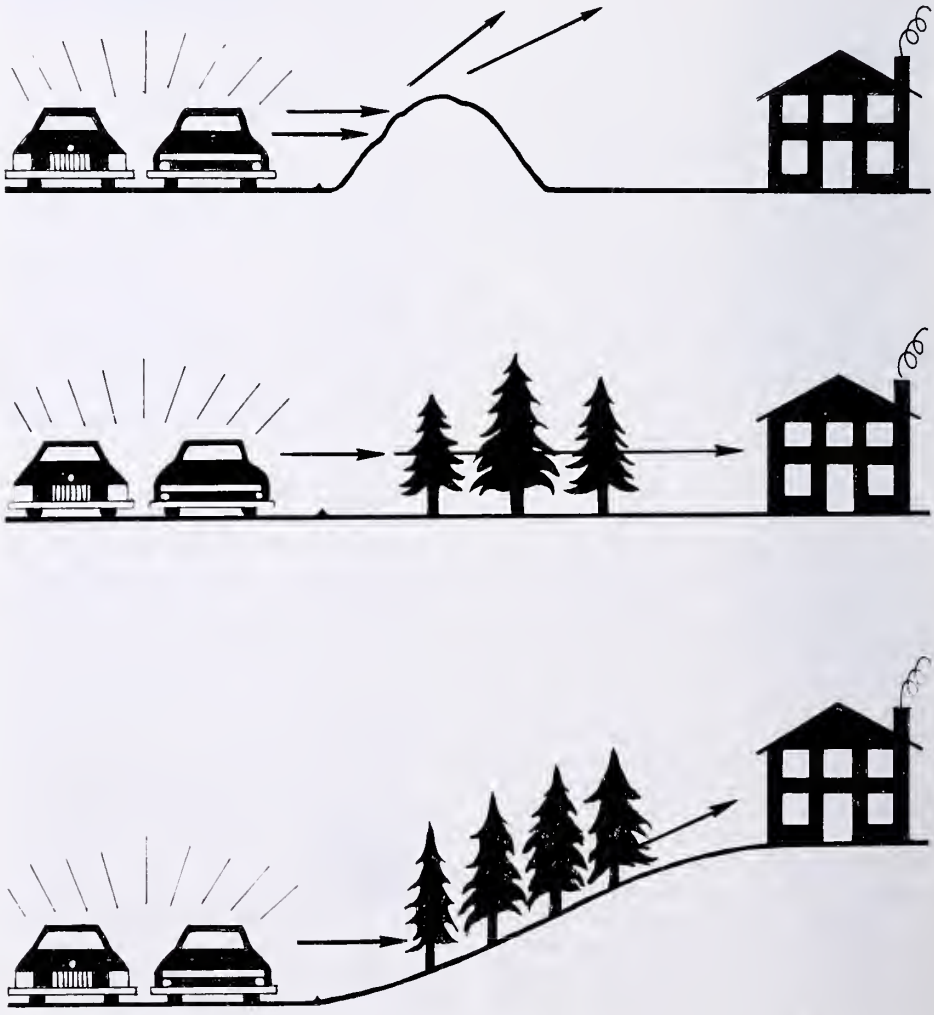
Remember that concentrated materials like the nitrates used in many synthetics can be poisonous. The capsule forms in particular may tempt unwary children. A few fertilizers are now appearing in child-proof containers. Frequency of application figures given in the chart hold true only during the active growing season of your house plants. Feeding should normally stop as growth slows and winter dormancy comes on.

With quick-acting fertilizers, feeding half the recommended dose twice as often will smooth out the jolts a house plant experiences when fed heavily but infrequently. Moisten dry soil before feeding to avoid root burn. Never feed a sick plant. Give a new plant, or a repotted plant, about a month to adjust to its new surroundings before feeding it.

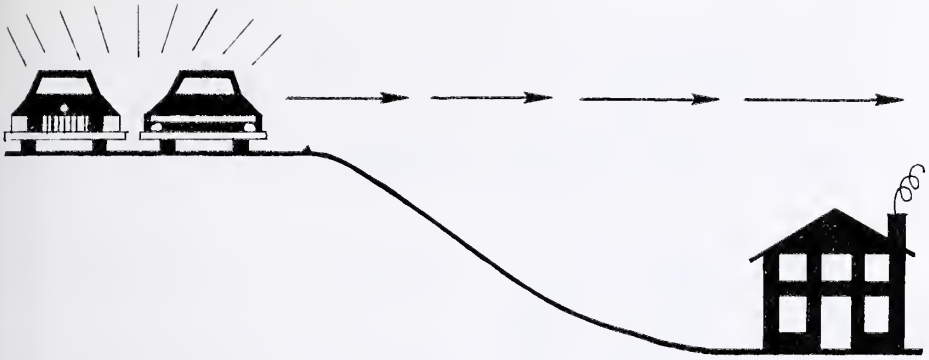
# PROTECTION AGAINST NOISE FROM STREETS AND HIGHWAYS

To get rid of—or at least reduce—the noise coming from a street or other bothersome source, there are alternative methods. If an outdoors preventive is necessary or desirable, one method is to erect a barrier at an angle that will deflect the sound away from the area where it is not wanted. A mound (of soil) along a highway is surprisingly effective. If indoors, it is a common and effective practice to use sound absorbing materials on ceilings and walls. These prevent sound reverberation (echoing).

The use of tree and shrub plantings as noise barriers, or noise "scatterers" on home properties is a common though not always effective practice. The results depend partly on the nature of the noise,



*Drawings by Eva Melady*



*i.e.*, whether shrill or low pitched. Wind direction also is a very important factor—noise travels much farther and with greater intensity *with* the wind than against it (or if there is no wind). Snow in the winter season in cold climates is the most effective noise-absorber in nature.

A psychological factor also is involved in sound perception. From experiments on noise transmitted through barriers of different kinds (Aylor and Marks), it has been demonstrated that noise intensity depends on visibility of the source; *reduced* visibility is accompanied by a reduction in *apparent* loudness. When sight of the source is completely obscured by a barrier, this effect *reverses*, that is, *apparent loudness increases*.

To reduce a complex subject to a few simple generalities, Aylor concludes—with regard to plants muffling noise—that vegetation diffuses concentrated sound effectively but absorbs little. And the degree of effectiveness depends partly on leaf size and foliage density, stem and trunk size, and so on. To give the best results, vegetation should be used as a screen on a line of sight between a concentrated source of sound and the listener.

# BINDERS AVAILABLE FOR *PLANTS & GARDENS*

Does your spouse complain about living room clutter? Ever want to refer to a past *Plants & Gardens* and can't find it because the issue was accidentally discarded with last July's newsmagazines? P & G has a longer shelf life than other publications because three of the four issues each year are devoted to special subjects of enduring interest. Readers keep turning back to them for years.

To keep the P & G Handbooks neat and tidy and in one place, why not order some binders? Each binder, covered in maroon colonial grain, embossed in simulated gold, holds four copies and costs only $2.50 plus $1.00 each for postage and handling (NY residents, add appropriate tax). Please direct inquiries to Publications Office, BBG, 1000 Washington Ave., Brooklyn, NY 11225. Missing some copies? See the back cover of this issue for a complete list of 60 titles.

# RECENT BOOKS WORTH NOTING

## In the Library of the Brooklyn Botanic Garden

(Please order directly from your bookstore, not from the Botanic Garden.)

### FOOD PLANTS AND CULINARY

**Grow Your Own Chinese Vegetables** by Geri Harrington. Macmillan Publishing Co., New York. Clothbound $14.95, paperback $6.95

Amaranth, cooking chrysanthemums, winter melon and many other interesting plants are discussed.

**The Children's Garden Cookbook**, edited by Susan Leach. Brooklyn Botanic Garden, Brooklyn, N.Y. Paperback, $3.99 postpaid

Recipes for preparing well known vegetables in a variety of unusual ways, from the young people who have grown them at BBG.

**A Field Guide to Edible Wild Plants** by Lee Peterson. Houghton Mifflin Company, Boston. $8.95

A most useful compendium in the well-known Peterson Field Guide Series. It treats the eastern and central states.

**Your Kitchen Garden** by George Seddon and Helena Radecka. Simon and Schuster, New York. Paperback $9.95

Recipes as well as how to grow vegetables. Also chapters on preserving and wine-making.

**Landscape You Can Eat** by Allan A. Swenson. David McKay Co., New York. Clothbound $10.95, paperback $5.95

Growing fruit and nut trees and berries in the home garden. Care, harvesting and potential problems.

### GARDENING

**Growing With Community Gardening** by Mary Lee Coe. Countryman Press, Taftsville, VT. Paperback $6.95

Profiles of projects in Cleveland, Chicago and other cities. Practical advice on how to set up such gardens.

**Reader's Digest Illustrated Guide to Gardening**, edited by Carroll C. Calkins. Reader's Digest Association, Inc., Pleasantville, New York. $16.95

A surprising amount of indoor-outdoor information is in this single-volume "encyclopedia." As with any work of this scope, a certain amount has been lost by simplification, *e.g.*, just four temperature zones for the United States. Still, it should prove useful for new gardeners and some experienced ones as well.

**Growing and Decorating with Grasses** by H. Peter Loewer. Walker and Co., New York. $12.50

Art comes in many forms, including the *Gramineae*. The numerous line drawings, attractively done by the author, should suggest ideas for floral arrangers in particular.

**Diseases & Pests of Ornamental Plants**, 5th ed., by Pascal P. Pirone. John Wiley & Sons, New York. $18.50

A classic reference is updated.

**Lawns** by Melvin Robey. David McKay Co., New York. $9.95

Turf care in warm and cool climates. Best varieties for particular uses. Section on ground covers, too.

**The Carpet Garden** by Renée and Steve Rockmore. Thomas Y. Crowell Co., New York. Hardcover $10.95, paperbound $4.95

The ultimate in mulching, a vegetable garden with a carpet. Roll out the rug, cut a few slits in it and grow your vegetables. Better ask your spouse first.

## HISTORICAL

**The Witch's Garden** by Harold A. Hansen, translated from Danish. Unity Press, Santa Cruz, CA. Paperback $4.95

The age of sorcery seems upon us again. Much interesting lore about mandrake, henbane, monkshood and other plants is included.

**An Illustrated History of Gardening** by Anthony Huxley. Paddington Press Ltd., New York. $24.95

Ever wonder how the lawn and lawn mower started? These and other subjects are treated with erudition and grace by a leading English horticulturist. The copious drawings from another era are of special interest.

**A Species of Eternity** by Joseph Kastner. Alfred A. Knopf. New York. $15.00

Adventures of John Bartram and other early naturalists who roamed the American wilds.

Bottle gourd *(Cucurbita lagenaria)* from Fuchsius, *De Historia Stirpium*, Basel, 1542

## INDOOR GARDENING

**The Encyclopedia Botanica** by Dennis A. Brown. The Dial Press, New York. $30.00

Basic indoor growing information, with chapters on selected plants, terrariums, pests and diseases, artificial lighting and hydroponics. There is an insert of color photographs.

**Crockett's Indoor Garden** by James Underwood Crockett. Little, Brown and Company, Boston. Paperback $9.95

The author, a well known television personality, happens to be a skilled, veteran grower of house plants. This new volume, which is both sound and crisp, will delight his many followers.

**Why are My Leaves Turning Yellow and Falling Off?** by Floss and Stan Dworkin. E.P. Dutton, New York. $9.95

In a question-and-answer format the authors, a television team, discuss house plant problems with familiarity and warmth.

**Tropica** by Alfred Byrd Graf. Roehrs Company, East Rutherford, N.J. $115.00

The author's *Exotica* has long been a standard reference work for greenhouse growers and keen hobbyists. Now, *Tropica*, in color, will be immensely useful to the same people. Highly recommended for the serious grower.

**The Indoor Garden** by Margaret K. Hunter and Edgar H. Hunter. John Wiley & Sons, New York. $17.95

Principally for the architectural designer interested in the construction of plant rooms in homes and office buildings.

**Successful Planters** by Georgia Orcutt. Structures Publishing Company, Farmington, MI. Clothbound $12.00, paperback $4.95

Planters, whether they are hanging baskets, window boxes or what used to be known simply as pots, come in an amazing variety these days. Their ornamental wealth is explored, with helpful advice on their construction and uses.

Garden sage (*Salvia officianalis*) from Fuchsius, *De Historia Stirpium*, Basel, 1542

**Greenhouse Grow How** by John H. Pierce. Plants Alive Books, Seattle, WA. $19.95

A good introduction for gardeners considering the installation of a greenhouse. Plant care is covered well, as are construction aspects and equipment to man (or woman) the unit. There is a chapter on solar heating. Source lists.

**Indoor Gardening**, U. S. Dept. of Agriculture Bulletin #220. U. S. Government Printing Office, Washington, D.C. Free from Superintendent of Documents

Special attention is given to garden structures indoors, especially artificial-light units, with diagrams that the hobbyist can put to work with a little ingenuity.

## LANDSCAPING

**The Small Garden** by John Brookes. Macmillan Publishing Co., New York. $19.95

The English way of designing small gardens is not quite the same as the American, but this British volume has a wealth of color photographs and designs, some of which may suggest ideas here.

**Homeowner's Guide to Landscaping that Saves Energy Dollars** by Ruth S. Foster. David McKay Company, New York. Clothbound $10.95, paperback $5.95

It's a matter of more than wind screens. The author, with a background in landscaping and ecosystems, gives some timely suggestions.

**Natural Landscaping** by Dean M. Gottehrer. E. P. Dutton, New York. $10.95

Some practical suggestions are given on what is a fairly complicated subject.

**Garden Design Illustrated** by John A. Grant and Carol L. Grant. University of Washington Press, Seattle. Paperback $9.95

Reprint of a 1954 edition.

**Homeowner's Guide to Landscape Design** by Timothy M. Michel. Countryman Press, Taftsville, Vermont. Paperback $7.95

Pitfalls are easy, even for dedicated gardeners, when it comes to the overall picture of a garden. This book deals with some basic aspects of design and can save some woe.

**Money Saving Garden Magic** by Judith Nelson. Illustrations by Jack Homesley. Prentice Hall, Inc., Englewood Cliffs, New Jersey. $8.95

Ideas for gardening on a shoestring are presented in a refreshing, perky style. Information on lawns, landscaping, tools, wildling gardens and backyard farming.

**Color for Your Winter Yard & Garden** by Helen Van Pelt Wilson. Charles Scribner's Sons, New York. $14.95

The season can seem shorter if berried treasure, evergreens and little bulbs are planted. Even certain deciduous trees have a place because of their branching pattern. Well illustrated.

## MISCELLANEOUS

**Endangered and Threatened Plants of the United States** by Edward S. Ayensu and

Robert A. DeFilipps. Smithsonian Institution and the World Wildlife Fund, Washington, D.C. $17.50

A valuable list of plants which are on their way to extinction unless steps are taken to preserve them and their habitats. Bibliographical references are given, too.

**Watch It Grow, Watch It Change** by Joan Elma Rahn. Atheneum Publishers, New York. $6.95

Basic botany for children, stressing plant parts. Not a bad introduction for parents, either.

**Medicines from the Earth** edited by William A.R. Thomson, M.D. McGraw-Hill Book Co. New York. $29.95

Certain plants have had traditional healing powers, and this attempt to separate fact from fiction by an English authority is timely. Many color drawings make this an appealing volume, too.

## REGIONAL

**State Flowers** by Anne Ophelia Dowden, Thomas Y. Crowell Company, New York. $7.95

Exquisite color illustrations are the hallmark of any book by this author, and this volume is no exception. A concise background on each plant is included.

**Gardening in the Temperate Zone** by Fred Heutte. The Donning Co., Norfolk, VA. $9.95

Advice for southern gardeners by the former director of the Norfolk Botanical Gardens.

**Wild Flowers of Britain** by Roger Phillips. Quick Fox, New York. Clothbound $19.95, paperback $8.95

The subject may appeal mainly to American travelers, but this is probably the most beautiful volume of the year. The numerous photographs in color are almost three-dimensional. There is a concise description for each plant.

**Climates of the States**, two volumes, with new material by James A. Ruffnar. Gale Research Co., Detroit. $38.00 the set

Official, detailed data from a forty-year period, on a state-by-state basis. Most useful for commercial growers but also of interest to extreme weather buffs.

**Gardening in the Upper Midwest** by Leon C. Snyder. University of Minnesota Press, Minneapolis, MN. $10.00

**Wild Shrubs** by Jay Spurr. Pacific Search Press, Seattle. Paperback, $7.95

Essentially for the northwestern gardener. Suggestions on ornamental kinds to transplant from their native habitats.

**Successful Gardening with Limited Water** by Margaret Tipton Wheatly. Woodbridge Press, Santa Barbara, CA. Paperback $3.95

The recent drought in California was a warning of things to come. Although the plant recommendations in this book are intended mainly for the West Coast, the principles of water conservation in the garden can be applied almost anywhere.

## SPECIAL PLANT GROUPS

**Pioneering With Wildflowers** by George D. Aiken. Countryman Press, Taftsville, VT. Clothbound $14.95, paperback $8.95

Reprint of a classic by the former Vermont Senator.

**Weeds** by Mea Allan. Viking Press, New York. $14.95

An English view, with an interesting history of how some weeds have jumped around, even across the Atlantic. Description of different kinds. Line drawings.

**The Illustrated Reference on Cacti and Other Succulents, Vol. Five,** by Edgar and Brian Lamb. Sterling Publishing Co., New York. $17.50

Part of a continuing series for the keen collector by two English specialists.

**Chrysanthemums: Year-Round Growing** by Barrie Machin and Nigel Scopes. Sterling Publishing Co., New York. $19.95

Mainly for the commercial grower, by English authors.

**Succulents and Their Cultivation** by Margaret Martin and Peter Chapman. Charles Scribner's Sons, New York. $19.95

For the person who has already discovered succulents, this work by two English specialists is a welcome contribution to the shelf. Cacti have been treated in another book by the authors.

**Edible Nuts of the World** by Edwin A. Menninger. Horticultural Books, Inc., Stuart, FL. $14.95

Gardeners in the United States know but a small number of nut trees. There are a huge variety in the tropics, and the author provides a fine, very informative introduction to them.

**Orchid Care** by Walter Richter. Van Nostrand Reinhold, New York. $12.50

Also chapters on choosing, propagating and hybridizing orchids. Numerous line drawings. Translated from German.

## TECHNIQUES AND CRAFTS

**Living on a Few Acres: Yearbook of Agriculture 1978** edited by Jack Hayes. Available from Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. $7.00

Back-to-the-land theme explored in 53 articles. The book is aimed toward the person seeking a part-time income from the land through farming, horticultural and other activities.

**Dyes from Lichens & Plants** by Judy Waldner McGrath. Van Nostrand Reinhold, New York. $14.95

**The Beginner's Guide to American Bonsai** by Jerald P. Stowell. Kodansha International Ltd., New York. $12.95

The ancient art of dwarfed potted trees has not always been successfully pursued on this side of the Pacific, and some adaptations have occurred since ex-GIs brought plants home from Japan in the 1940s. Much useful growing and training information is given here by one of the early practitioners.

## TREES

**The Illustrated Encyclopedia of Trees: Timbers and Forests of the World** by Herbert Edlin and Maurice Nimmo. Harmony Books, New York. $15.95

An attractive overview with copious photographs in color. The section on timber is of particular interest. The book originated in England.

**The Tree Key** by Herbert L. Edlin. Charles Scribner's Sons, New York. Clothbound $14.95, paperback $8.95

A handy little guide to 235 kinds. Color drawings are a help, too.

**Trees of North America and Europe** by Roger Phillips. Random House, New York. Hardcover $15.00, paperback $8.50

The 1,000 color photographs make this very useful for identification purposes though some, *e.g.*, white oak, should have been checked more carefully, and an index of botanical names would have helped. Despite the title, this is an English work and gives a distorted picture of what is grown in North America. Within these limitations, it is a sound contribution.

**Simon & Schuster's Guide to Trees, American edition**, edited by Stanley Schuler. Simon and Schuster, New York. Clothbound $16.95, paperback $7.95

Some 350 color photographs adorn this book, which originated in Italy and includes a number of plants grown in mild climates as well as many from the colder reaches. There is a concise text for each tree, line drawings also.

**Magnolias** by Neil G. Treseder. Faber & Faber, London. £30

An English nurseryman provides a very extensive review of a beautiful group of ornamental trees. Color plates.

**Japanese Maples** by J.D. Vertrees. Timber Press. Forest Grove, OR. $39.50

A labor of love that will be well received by every acerophile. This virtually definitive treatment, with color photographs, is a reminder of the diversity to be found in the Japanese maple.

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